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Modern Home Nursing

AND FIRST AID

Everybody's Guide to the Principles and
Practice of Hygiene and Nursing in the Home

EDITED BY
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The Arrangement of the Sick Room

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PART I: *CHAPTER I*

THE IDEAL NURSE

by K. D. KEELE, M.D., M.R.C.P.

THE housewife is at the best of times a woman of many responsibilities. In such times as these they loom very large, and become even more varied. One of the additional responsibilities is the care and management of illness or accident which may occur in any home. Conditions today make her task in this respect tenfold more difficult. We live under constant strain and anxiety, and that alone is apt to cause illness and accident. To have a method of dealing with such crises that may arise gives confidence and will save much unnecessary misery and suffering. In general, the most useful weapon of all is the doctor. He, however, finds in such times even more tasks divulging on him. Special emphasis is laid therefore in this book on the way the home nurse can aid the doctor. She is the vital link between doctor and patient, yet so often she cannot understand what the doctor wants her to tell him, and wastes his time instead of helping him. Knowledge of how the doctor would require her to proceed becomes doubly important when he may have difficulty in getting to his patient—that is, if he can come at all.

With these facts in mind the first part of this book has been devoted to outlining the nursing ideals to be aimed at, and very brief descriptions are given of the structure and functions of the main organs of the body. So to get the real benefit of this book, the first part should be read as well as the chapters on practical nursing.

In this way the doctor's instructions will be made clearer to you, and practice based on understanding adds both to interest and efficiency.

Lastly, we have avoided suggesting the use of any apparatus that cannot be bought for use in the average household, or hired if really necessary, or "contrived" if you have a handy person in the house.

THE NURSE'S TEMPERAMENT

Few people who have ever attempted nursing will be surprised to hear it said that a nurse's job is often most difficult. That is why, after all, it has developed into a specialized profession. But the home nurse is someone who undertakes the simpler cases which are not removed to hospital. Even so, she finds that she has got to fit into her place like a piece in a jigsaw puzzle. She has duties all round—to her patient, to the doctor, to the relatives and other members of the family, and above all, perhaps, to herself. When one puts it like this, the task certainly looms large. But let us consider these responsibilities one by one.

And first we will consider the nurse herself.

It is perhaps a curious thing that we always consider a nurse to be a woman. There are male nurses, especially in institutions where strength is necessary for the control of violent patients—but for the most part the task of nursing falls to women. And the reason for this is given by the poet who understood that "unfolded out of the sympathy of the woman is all

One of the home nurse's duties should be to prepare a report of the patient's condition which she can show to the doctor.

sympathy." Without this quality of sympathy no one should ever attempt to nurse a sick person. Sympathy is the one psychological necessity for the care of the sick; with it go evenness of temper and patience. Intelligence is obviously an asset to a nurse, especially as it manifests itself in anticipation of the patient's needs. It is always up to a nurse to notice what the patient is going to need and quietly forestall his request.

From the doctor's point of view a nurse needs other qualities of mind. He is most affected by her accuracy in powers of observation, and her obedience in carrying out instructions.

Obedience, too, is of obvious importance. It is no good saying one thing to the doctor and another to the invalid. If, for some reason, a procedure decided on has not been carried out, it is far better to say so. The patient's condition will depend on what *has* been done, not what was meant to be done.

Finally, there is the need of loyalty to the doctor. Occasions may arise, particularly when the invalid is near and dear to you, when your feelings as a mother or a wife combat with those of a nurse, and you feel impatient or dissatisfied with treatment or progress. It is of the greatest importance that the patient should regard doctor and nurse as members of a team. And if he suspects that the two are pulling in opposite directions, the added symptoms of gnawing doubt and anxiety are added to his troubles. If, therefore, as a nursing mother, shall we say, you disagree with the doctor, be frank with him and tell him your doubts. It is part of his job to satisfy you, and frank discussion will nearly always clear the air.

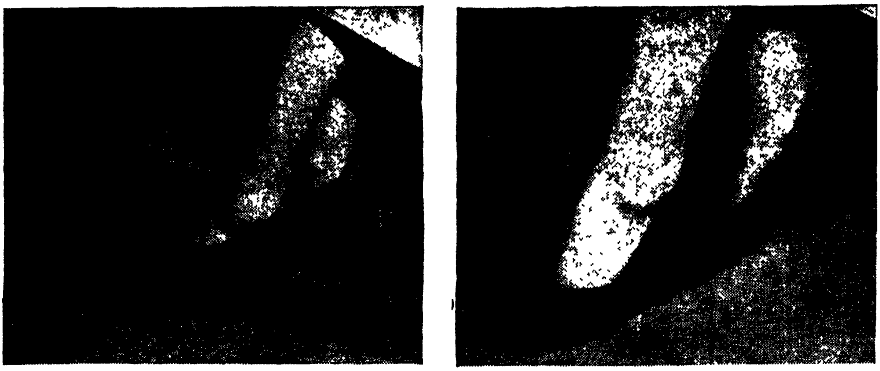
A nurse, then, is the link between doctor and patient in many matters, and as such she must develop suitable mental qualities—and these are sympathy, even temper, efficiency, anticipation, accuracy of observation and report, obedience and loyalty to the doctor. It is perhaps a long list—but it comprises the golden rules of nursing.

So far we have seen what the good nurse's attitude should be, looked at from the temperamental or psychological side. Now let us consider other channels by which she comes into contact with the patient, for example, through his eyes, ears and skin. Any one who has been ill knows how the sick room for the time becomes the whole world. And this world is inhabited very largely by the repeated appearance of one person—the nurse. Irritability and over-sensitiveness of the senses, such as sight, are common in illness, and so it becomes of importance that if you undertake nursing duties you should not offend either by sight, by hearing, by touch, or even by smell. In fact, the impression made should be pleasant in all these characteristics.

A nurse's personal appearance, therefore, should never be neglected. And perhaps nothing aids this so much as her own feeling of fitness and vitality. Given this, a cheerful expression is easy and encouraging to the patient. Keeping fit, then, is a special part of a nurse's routine which we will describe later. Next to the face, the nurse's dress will catch the patient's eye. Here, obviously, simplicity and neatness are the keynotes.

First the head should be covered. Of course, a cap such as the professional nurse wears is ideal. But the object of preventing escape of hair or dandruff is obtained perfectly well by covering the head with a simple handkerchief turned back to a triangle and pinned at

The good nurse should be able to anticipate her patient's needs; she should, for example, put a drink by the bedside, or, unasked, renew a hot-water bottle that is cold.



The shoes on the left are correct: they are comfortable, low heeled and noiseless. Those on the right are wrong: they have pointed toes and high heels that tire the feet; they turn over, and make an irritating clatter that would cause a sick person real distress.

the back of the neck or tied, if this method is preferred.

As regards dress itself, there is no utility in the stiff cuffs and collars adopted by hospital nurses as part of their uniform. These in time will disappear. Any plain frock with a skirt of moderate length and short sleeves, or sleeves that can easily be rolled up, is suitable. Over this an overall, also short-sleeved, and belted, is best. For preference this should be white, but that is not essential as long as a well-dyed garment is worn, which can stand wetting without injury.

One point cannot be stressed too strongly. However mild the illness which is being nursed, the nurse who is also housekeeper, cook and general minister to the whole family, must make a habit of washing her hands before touching the patient, and also putting on her special overall and head covering. These must be removed, and her hands washed again before she goes back to her household tasks, or comes into contact with other members of the family.

This may seem an unnecessary piece of fussing, say, if your boy is in bed just with a common cold; but it is the simplest and most elementary precaution against the spread of infection.

There are points about shoes and stockings which are often ignored. Nursing is arduous and largely a standing job. It is therefore important that stockings worn should not be of silk, which fails to absorb moisture from the feet—but wool, which does so, and is hardwearing, too. If silk stockings must be worn, woollen underhose can be put on beneath them, or a pair of woollen ankle socks put on over the stockings. Stockings should never be kept up with garters which obstruct the circulation of the blood in the legs. This greatly adds to discomfort when you are standing all day.

THE NURSE'S SHOES

Shoes must have three main qualities from the nursing point of view. They must be comfortable, low heeled and noiseless. Their appearance takes a minor part. When one says low heeled one does not necessarily mean flat heeled. A woman used to a high heel will feel considerable pain if she goes straight to a flat-heeled shoe. The strain on the arches is much greater and, in consequence, a stretch pain is produced, and eventually even flat feet. This is the penalty of the wearing of high heeled shoes as a fashion!

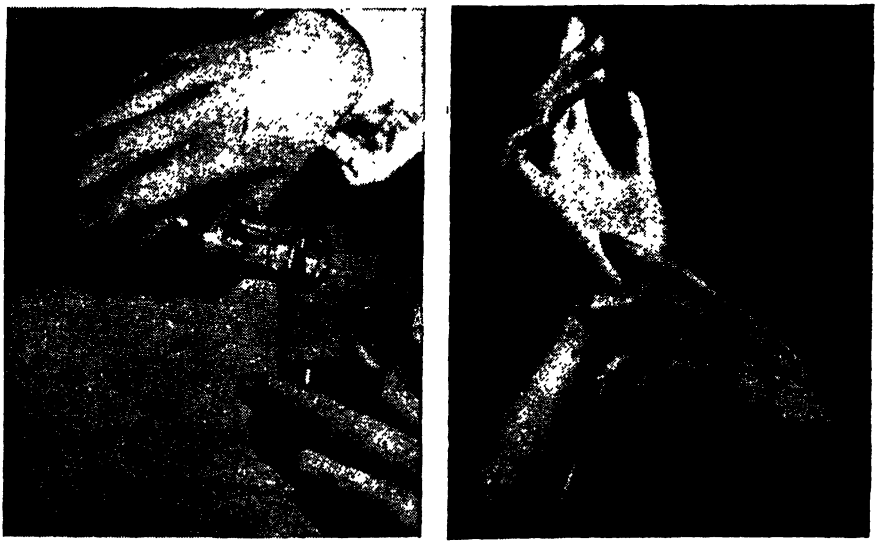
The toes of the shoes should be moderately blunt, not with narrow points. This gives room for the toes to move and perform their balancing functions—the pointed toe crushes them into an inert bunch, incapable of taking weight, which is cast on to the sole of the foot, again producing strain and flattening of the arches. It is amazing how distorted and twisted feet can become as a result of bad footwear of this type, and the almost unbelievable positions which toes, particularly big toes, get into under the pressure of a pointed shoe.

And the shoes must be silent—what irritation it is to a feverish patient to listen to the tap, tap, squeak, squeak, of shoes approaching the door and squeaking up to his bed! On the fiftieth occasion it is like torture—and yet how innocent and ignorant of her crime the nurse may be. To avoid this, of course, rubber heels and soles are ideal. Squeakiness of the shoe, due to rubbing between the sole and the upper, will probably need a cobbler's attention. But apart from these measures applied to the shoe itself there is, of course, the simplest and most important of all—the art of walking quietly. Without cultivating a ghostly glide it is of obvious value to learn how to move smoothly, avoid knocking into the bed or the door, and scraping the feet on the ground or stamping. These do seem obvious things—and indeed are so the moment one thinks of them.

A last word on shoes. What has been said, can, in many cases, be summed up briefly—wear a not too old, comfortable pair for nursing. Conversely, above all, never start a nursing campaign in new shoes.

CARE OF THE HANDS

And now as to your hands. Since they come into most intimate contact with the patient they can make or mar a nurse. To children no hands are as gentle and trusted as the



The hands on the left are ideal for a home nurse. The nails are short, squarely cut and innocent of varnish. They are easy to keep clean. Those on the right, beautiful as they are, are useless as nurse's hands, with their long, coloured, shaped nails.

pestered to do things. Disappointing as it may be if a meal over which much trouble has been taken is left half uneaten, nevertheless it is no good fussing about it. Matters only become worse. On the other hand doctors' orders must be carried out, in the administration of medicines, etc. Firmness and persuasion will usually succeed in this. A nurse should on no account whatsoever even begin to lose her temper over such a dispute—in that case the battle is indeed lost.

VALUE OF ROUTINE

It is a good rule to decide early on in the illness on a definite daily routine time table which the sick person soon recognizes. He even looks forward to the various items as a break in the monotony. Then apart from these planned interferences the patient may be left alone. This is what a sick person wants most of all—to be left alone. It does no good to disturb him and to arrange the pillows every few minutes—a failing of the fussy type of nurse. And nothing annoys a patient who cannot sleep so much as the repeatedly cautious approach of an over-anxious nurse to see if he is sleeping. Tact and common sense are the touchstones of nursing a patient.

If the last sentence is true for the relationship between nurse and patient it applies even more to that between nurse and relatives. One sometimes hears both doctor and nurse saying that it isn't the patient who is difficult to manage but the relatives.

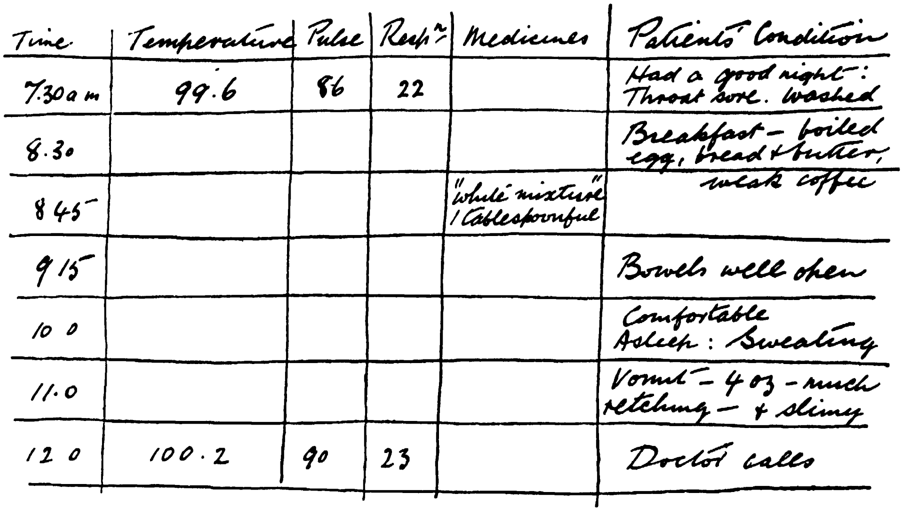
With friends and relatives the main problem that arises is, should they be allowed to visit the patient? In the first case, the doctor, for various reasons may state quite definitely that no visitors should be allowed. At this point the nurse's troubles start. She has one standard to guide her in all that she may say to keep the relatives out of the invalid's room—it is the welfare of the patient. This *must* come first. And usually such an appeal will satisfy reasonable relatives. But sometimes their natural anxiety makes friends or relatives unreasonable over this matter, and all the tact and common sense at one's disposal may have to be used—even to a final appeal to the doctor himself on the matter. A compromise which will often satisfy over-anxious people is to let them just look into the room for a few seconds.

Reasons for not permitting visitors are, for example, when any excitement does harm as in some serious illnesses, or if the patient is sleeping or undergoing some particular form of treatment which must not be disturbed.

If relatives are allowed in, then again the welfare of the patient must decide their number and how long they may stay. The patient must not be wearied or excited unduly. Some relatives take the opportunity to bring food outside the patient's diet, or cigarettes to one who is not allowed to smoke. Such things may be done out of ignorance or sometimes from sheer perversity. It is up to the nurse to prevent them.

THE NURSE AND THE DOCTOR

We have already mentioned the psychological equipment which a doctor values in a nurse—the qualities of accuracy of observation, efficiency and obedience—and these cannot be overestimated, particularly in the home, even more than in a hospital. For at home the nursing responsibility is on one person very often, and that person may be performing the work of a mother and housekeeper as well as a nurse. In her duty, then, as a doctor's assistant it is of great importance that she should understand at least the main principles of what the doctor's



Time	Temperature	Pulse	Resp^{n}	Medicines	Patients' Condition
7.30 a m	99.6	86	22		Had a good night: Throat sore. Washed
8.30					Breakfast – boiled egg, bread + butter, weak coffee
8 45				"white mixture" 1 tablespoonful	
9 15					Bowels well open
10 0					Comfortable Asleep: Sweating
11.0					Vomit – 4 oz – much retching – + slimy
12 0	100.2	90	23		Doctor calls

Fig. 1. *This is the sort of report you should keep of the patient's condition.*

treatment is. By so doing she has something to guide her in all her actions instead of working blind. The doctor plans a line of treatment and initiates it—the nurse watches its progress and notes deviations from the line of development laid down by the doctor.

To understand the treatment properly a certain knowledge of the structure of the body, the work of the various organs, and how this may be disturbed is necessary. These matters are described in this book with the nurse's duties in view, and designed so that she will be able to understand the doctor's plan and give him all the help she can in carrying it out.

Now the doctor works not only on observations made by examining the patient himself, but by what he is told about the patient by those who have most opportunity of watching him closely. Thus it is that a nurse is very largely the eyes and ears of a doctor, for she has this opportunity of continuous observation. Can she use it? Not unless she knows what to look for. So many well-meaning people offer the doctor a glut of information, quite useless to him in his treatment of the patient by virtue of the fact that they did not know what to look for. A large part of this book will be devoted to elucidating this important part of a nurse's duties. But here let us note a few points on the best way to make a report to a doctor.

When the doctor arrives in the house and says to the nurse (it may be the patient's mother or sister), "Well, how is little Jimmy today?" it is his way of asking for a report on his patient's condition since his last visit. From the reply given him he sifts out all the useful information from the useless—all the wheat from the chaff. And the wheat in this case is any change of symptoms, how he has slept, his appetite, etc., not, for example, that his aunt or grandmother thought he was looking a bit better.

Perhaps you find it difficult to understand at first why the first group of facts is so much the more important. It is because they are *direct observations*—not hearsay and opinion. In a court of law hearsay evidence is no evidence, and this rule is made because it is so proverbially untrustworthy. Like a court of law, the doctor is out for truth, and knows this fact and so ignores the aunt's opinion.

THINGS THE NURSE SHOULD NOTE

The doctor does not want to know her opinion on this matter. Let me repeat, an observation is what you actually see, hear, smell or touch—its interpretation is a matter for the doctor. The nurse's task is to observe and report. The best way of making a report is to keep a note-book. In it should be entered the observations, with the times of their occurrence, accurately. Times of taking meals, medicines, and also of any change in the patient's symptoms should be noted. Temperature, the pulse rate, and action of the bowels will be plotted on a special chart designed for the purpose. Any additional points about these observations can be put down in the note-book. If there is any doubt in the nurse's mind regarding the importance of some symptom she should note it down—it is not for her to judge on this matter. This report book should be kept neatly, so that it can be easily understood by the doctor. If well done, he may want only to ask a few questions as to further details of some event such as vomiting, for example, and nothing more. It saves his time and yours, as well as a lot of talking for two busy people.

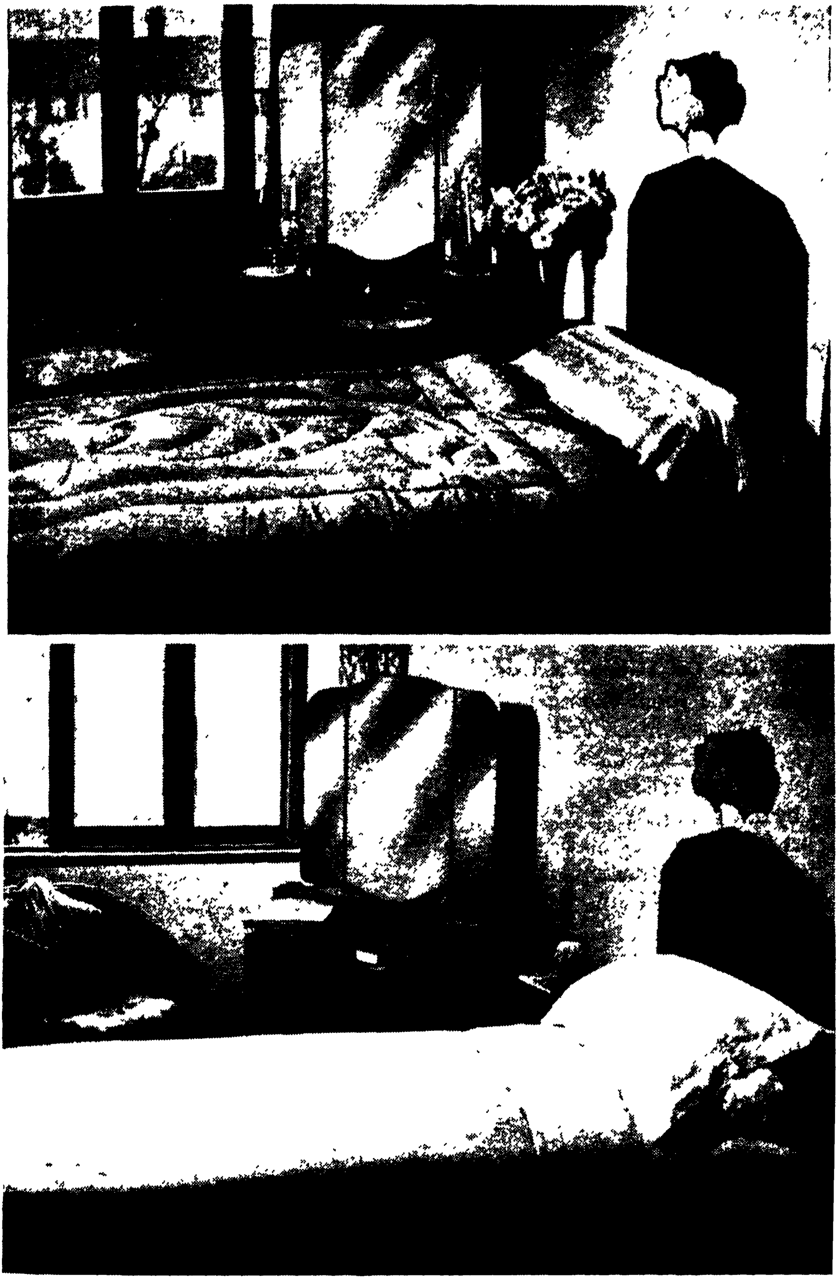
The importance of this report will now have become evident, as will perhaps some of the difficulties in doing the job well. Usually it is true the doctor can check up on your observations by making his own and by questioning the patient. But sick patients are not good witnesses and he does not want to trust their observations. So that it becomes evident how vital it is that the nurse's report should be absolutely true and accurate in every point. It must omit nothing—and distort nothing. We have emphasized before the importance of the nurse's loyalty towards the doctor. Without it the campaign of treatment will surely fail. This loyalty also applies to the information given to a doctor in confidence. Sometimes a patient will confess some fact of which he would never speak if he was in health. If this fact is of no medical importance the nurse treats it as a confidence which goes no further, but it may be of importance as regards the disease from which the sick man is suffering. It must then be added verbally to the report, on the doctor's arrival.

In a case of emergency the smooth co-operation between nurse and doctor becomes of even greater importance. Then orders must be obeyed quickly and efficiently, and observations reported equally rapidly and accurately. Here coolness and speed are the essence of the matter, and teamwork becomes of paramount importance in the common task.

THE SICK ROOM

The choice of the sick room may make a great difference, particularly if the case being nursed is a long one lasting several weeks—a difference not only to the comfort and progress of the patient, but to the nurse as well. Choice, of course, may be very limited but the point is to bear the ideal characteristics in mind. Ideals are rarely reached but they point in the right direction.

Which room to choose is the first question. Well, quiet is perhaps the first criterion, and the quietest rooms are on an upper floor; one of the bedrooms is usually the best, except under certain circumstances such as war risk of air attack when general safety is



The room in which a sick person is nursed should be as simply arranged as possible. Leave in only necessary furniture, and remove all ornaments and superfluous furnishings. If possible, remove eiderdown and substitute a plain, light bedspread. The top photograph shows one corner of an ordinary bedroom, and (below) the same room arranged as a sick room.

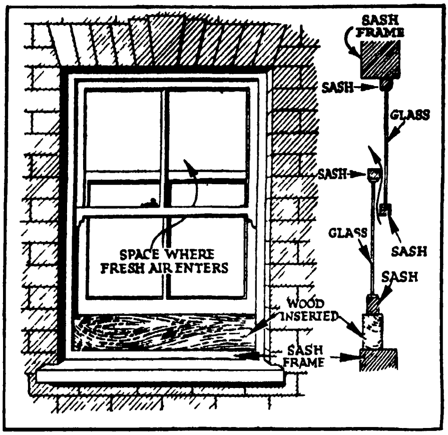


Fig. 2. *Hinckes Bird's method of ventilation.*

perhaps greater on a lower floor. Also in heart cases, where for a long while the patient may get up a little but must avoid stairs, a downstairs room is definitely to be preferred.

POSITION OF THE SICK ROOM

Ideally, the room chosen will face south, because from this direction plenty of sunshine enters it, and a patient in bed follows the sun's rays day by day with pleasurable attention. Apart from this they make the room warmer and pleasanter. Only in very hot weather should a northern aspect be chosen.

Just as important as either of these points is the relation of the room chosen to the lavatory and bathroom, for obvious reasons; if possible, the nurse should have a room on the same floor quite close, so that she can easily be called, and also to save her legs.

These then are the main points to keep in mind when you are choosing a sick room.

This should be of moderate size—preferably about twelve feet by ten feet. Loftiness is excellent, with good window space.

Two important problems have to be considered: first, the furnishing and arrangement of it, and secondly the best method of ventilation.

Furniture should be of the simplest—all superfluous pieces should be taken away. In the sick room will be the patient's bed with a small bedside table; a chair on the other side; a larger table for nurse's apparatus; an easy chair both for patient's use; and a screen between the patient and the door in case of draughts. This is all that is necessary in most cases. Of course, the actual arrangement depends on the relation of door, fireplace and window in the room, but a suggested example is shown in the illustration. Of all these pieces of furniture the bed is the most important. This should always be placed so that there is a clear space on both sides for nursing purposes, care being taken that it does not lie directly between the two main ventilating spaces of the room, i.e., window and fireplace, because this is the draughtiest place in the room, and the patient must be kept out of draughts.

VENTILATING THE SICK ROOM

The object of ventilation is to get rid of foul used air, and replace it with fresh unused air from outside—and to do this without creating streams flowing at relatively quick speeds constituting draughts.

Now foul air is usually warm, and hot air rises, so that it can be neatly permitted to flow out of the room by keeping the window open at the top. By opening the window at the bottom cool air is allowed in. But the fireplace also plays an important part in ventilation, particularly in cool weather when there is a fire. For as the flames rise up the chimney they suck a draught after them, and so the air of the room is sucked out up the chimney and replaced by air from outside coming through the window. The patient's bed, of course, should be out of this line of moving air, or protected by screens.

BENEFITS OF FRESH AIR

In very cold weather one may not want to open the window. In this case a simple device known as the Hinckes Bird's method may be used. It consists of raising the lower window sash a few inches and supporting it in position by a board. Air enters the room between the upper and lower sashes as in the illustration. In certain diseases it has recently become accepted that relatively open air treatment is best, and although the patient is feverish, the window is kept open all the time, warmth being retained with adequate bed-clothes, hot-water bottles and screens.

In any case, it is useful and pleasant to throw open the windows in the sunny hours for a short time each day, taking great care in the matter of draughts. A patient who has once been in a draught may easily become irritable about ventilation and object to any fresh air on the plea that draughts harm him. Then he gets to looking for draughts and always finding them whatever you may do!

Doors are sources of draughts but not of ventilation and they should therefore not be opened to increase ventilation. After all, it is not fresh air that comes in through a door.

Having made sure that the air in the sick room is being regularly and smoothly replaced one must next see that its temperature is correct. A thermometer on the wall should register sixty degrees, and not deviate more than five degrees either side of this reading. In this country the temperature will usually be lower than this, so the room must be heated. Coal fires are still perhaps the commonest way, and as we have seen they aid ventilation as well. They are dirty and need a lot of tending, but are cheerful and popular. Electric fires are the cleanest, and do not create fumes, but tend to dry the air. They are the best if ventilation is kept adequate, and a small dish of water put before them. Gas fires have similar characteristics, but give off fumes which makes them less desirable.

LIGHTING THE SICK ROOM

The sick room should, if possible, be lighted by an electric lamp, placed above the head of the bed, so that it does not shine into the patient's eyes. Such a lamp can be carefully shaded at night if not turned out, so that a night nurse can all the more easily keep observation on her patient. Another well shaded lamp may be kept by the side of the easy chair which the nurse will occupy if she is going to sit up at night with the patient.

CHAPTER II

THE DOCTOR'S APPROACH TO DISEASE

by K. D. KEELE, M.D., M.R.C.P.

IN this chapter we are going to try to understand how a doctor "gets to work" on a patient; first finding out exactly what is wrong and then starting to put it right. In this way, we shall make clearer the aid rendered by the doctor's partner—the nurse.

The doctor is called in to see a person suffering from disease. What is "disease"? The word literally means dis-ease or discomfort, and simply refers to those vague disagreeable feelings which are a feature of most diseases. But disease is perhaps best defined as the absence of the feeling of well-being so characteristic of vigorous health. Health is a state of harmony of mind and body, in which both interlock smoothly and easily. Harmony between the various organs is shown when the stomach and intestines, for example, digest and absorb food efficiently, and the muscles are, as a result, well fed and strong. Harmony between different organs in the body is almost unbelievably complex and delicate. Is it surprising, therefore, that such a delicately balanced chord as health should sometimes be shifted into the disharmony of ill health?

If disease then is a state of bodily disharmony, how and why does this state occur?

First, body equilibrium may be upset as a result of the invasion of microscopic forms of life known as bacteria. These are of many kinds. They lodge in various parts of the body, whence they distribute poisonous products called toxins into the blood stream, by which means the whole of the body becomes affected. So it is that in any disease produced by bacteria there is a group known as "toxic" symptoms which are very common. Now of all the organs in the human body the most recently developed in the course of evolution, and therefore the most sensitive to disturbance, is the brain. Consequently, this part is upset in all toxic illnesses, as shown by headache, mental irritability or its opposite, fatigue and drowsiness, and sometimes the extreme degrees of these symptoms, delirium or great excitement on the one hand and coma or unconsciousness on the other. These extreme symptoms occur only in serious diseases such as typhoid fever—and then by no means in all cases.

BACTERIA AND SYMPTOMS

It is through a "centre" in the brain that the regulation of temperature is made—so that fever is also part of the brain's reaction.

The toxins, of course, may also poison and upset the functions of other organs as well, producing various groups of symptoms which in practice help the doctor to find out what kind of bacteria are causing the disease. Skin rashes are one good example of this kind, as in scarlet fever.

There are many different bacteria or germs which invade the body, upsetting its harmony of health in their own particular way. Each forms a pattern of symptoms peculiar to itself in its effects upon the body which has been mapped out and labelled. The label is the name we give to a disease, such as diphtheria and scarlet fever.

HOW DISEASE ARISES

Another factor in the production of disease is concerned with new growth. As we all know, in childhood the body grows as a whole, and it probably has never occurred to you how wonderfully harmonious growth is. Why doesn't one leg grow longer than another? How does the ear remain of proportionate size to the head—or indeed how does the head itself keep in proportion to the rest of the growing body, within certain narrow limits?

Sometimes this harmony is disturbed, and disease is the word used to describe the result. The regulators of orderly growth may fail, and unusual shapes and sizes of the human body result—or perhaps a limb, such as the leg, is not properly moulded. But it is a rarity for Nature to slip up in her task in this way. Since, however, such an error, when made, occurs in the early stages of body building, that is, in the womb of the mother, all these unusual body proportions are labelled congenital diseases.

More often one group of cells finds itself stimulated to growth on its own, quite apart from the other parts of the body. The regulators of growth proportion have broken down. The cells of this tissue multiply and produce a lump—a small new growth. Such a lump may be quite harmless, or it may become a real danger to the body. For example, a wart is a little new growth on the skin, and one such growth often accompanies us through a long life doing no harm. But as we advance in years these new growths become more inclined to break the fences set up by their neighbour tissues, and to invade them. When this happens the change is named cancer. But this label has created a lot more fear and apprehension than it should. For if discovered early and treated properly it may be cured.

There are, of course, many other ways in which the health of the body may be upset, but infectious diseases from invasion by bacteria and new growths are the largest part of the diseases doctors meet day by day, and serve our purpose of clarifying the answer to the question—"What are the causes of disease?"

And now we can see more clearly what disease itself is. It is disturbance in the body, part of which is due to the

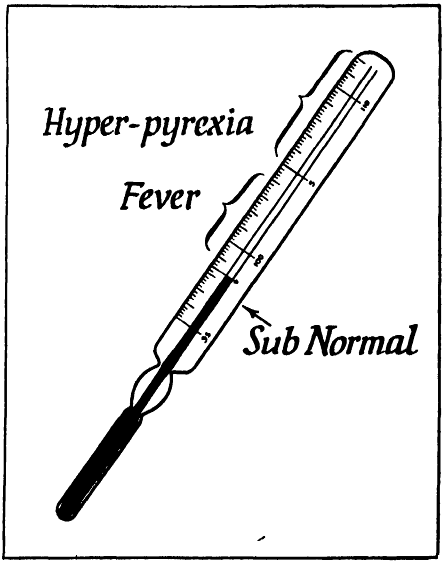


Fig. 1. *A clinical thermometer showing the marking. The diagram indicates the region of subnormal and normal temperature and also the registration of fever and high fever. (For use of thermometer see page 35).*

poisons, etc., introduced into it, and part due to the reaction of the body in its effort to throw off the harmful disturber of its equilibrium. Note this then, that some of the symptoms are evidence of a good bodily reaction, and are in consequence welcome to the eye of doctor and nurse, and not to be interfered with. An example of this, indeed, is fever itself. If after invasion by germs a patient becomes toxic and ill and yet raises no temperature it is a bad sign for the outcome. Again, in the past, drugs were used extensively simply to bring the temperature down until it was recognized that this in itself was bad. The temperature, indeed, must fall, but only as a sign of the poison having been conquered and expelled from the system.

WHAT IS "CASE HISTORY"

The history of the case is the story of the patient's medical life from its beginning. For the sake of clearness the history is divided into various parts. First, the story of the present condition of the patient is obtained. The answer to the question "What do you complain of?" gives some kind of lead to the doctor, who then proceeds to ask a series of questions about the complaint. For example, if the patient complains of a pain in the chest, the doctor will ask him where exactly that pain is, what it is like, when does it come, what makes it worse, and what relieves it, etc., until he is satisfied he knows that pain thoroughly. It may take him two or twenty questions to get the knowledge he wants. When the patient or his relation has told all they wish, then the doctor asks questions about the various systems and functions in general, in order to assess the patient's condition, and to complete his mental picture of the story. This part of the history will include questions on the patient's appetite, weight, etc.

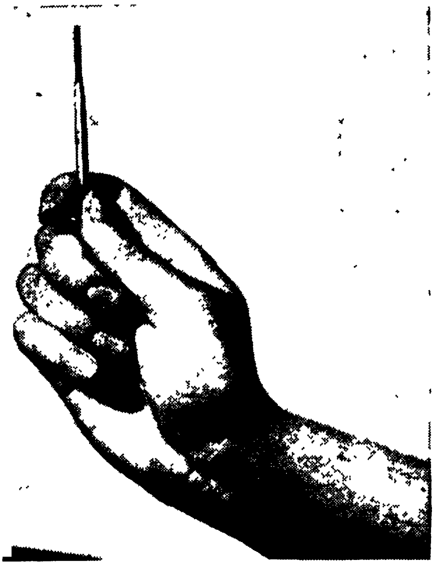
Next, the doctor turns to what he calls the past history of the patient. This is really a medical review of the patient's life from birth onwards. We have already seen that some diseases are congenital, i.e., are present at birth. But usually he wants to find out what serious illnesses the patient has had, in case they should be related to his present complaint. Also at this time he may inquire into the personal habits of the patient as far as these may be relevant to his health. Consumption of alcohol and tobacco are sometimes important in this respect and he may require information on this subject.

Then, sometimes, the doctor will want to go back even further, as it were, into the patient's past—into his family history. Are there any diseases which run through the family?—as indicating perhaps a predisposition on the part of the patient. Or has there been any infectious illness in the family? How closely was such a person in contact with the patient?

WHAT THE DOCTOR ASKS

Such, very briefly, is the scheme that a doctor has in mind when he asks questions about a patient. It is as if he were filling in the picture of the patient's medical life stroke by stroke as he asks each question. But the way that the final picture develops depends also on the ability of the patient or his relation to *answer* the questions asked, and it is for the latter reason we are discussing the matter here. For the more you, as a home nurse, understand what the doctor is getting at, the more you can answer those questions in a useful manner.

Let us emphasize again what kind of answer is useful. Times, dates of illnesses, how long in bed, if in bed at



Before a thermometer can be used the mercury must be shaken down to register below 97 degrees. Above you see how to hold the thermometer to shake it down.

all, operations, if any—all these are data which will help. In general, accuracy as to times, that is, age, duration of illness, dates, etc., are the most important of all—for remember this is a time picture which the doctor is trying to build.

Now the history which a doctor gets chiefly concerns the patient's account of his own sensations or experiences—these are symptoms. The next stage is for the doctor to examine the patient for anything abnormal, detectable by his sense of sight, hearing or touch—these are known as signs of disease. Symptoms then, are sometimes described as being subjective, or felt by the patient, signs as objective, or detected by someone outside. Often, however, in actual practice the word symptom is used more loosely.

Examination of the patient means a systematic exploration of the patient's organs using the senses. The body is examined as a whole if necessary, common sense, of course, deciding if and when this is indicated. Each part of the body is inspected, palpated, sometimes percussed, and auscultated. All these words, to which you must get accustomed, are explained in detail farther on in this chapter. Inspection means carefully looking at the patient with a view to detecting any abnormality. Whole years of medical training lie behind a doctor's apparently casual glance at a patient who enters his consulting room. His complexion, his manner, his walk, his voice, the movements of his hands, the condition of the nails, and a hundred other points of importance are taken in by the doctor on the patient's short journey between the door and his desk. The same applies to the stages of examination with the patient stripped. The shape of the chest, the position of the visible beat of the heart, the movement of the abdominal wall—these and many more points are noticed and docketed for future reference.

Palpation is a word used to describe touching. Various qualities, such as

With sharp, downward flicks of the wrist, as shown above, the mercury thread is shaken down, and the thermometer is ready to use. (See pages 35-37 for use of a thermometer and temperature taking.)

Taking the temperature in the mouth. The bulb of the thermometer is laid under the tongue and the patient is asked to close the lips on it to hold it in place, but not to bite on it, as it might easily break in the mouth. The thermometer is retained in the mouth for a period of one-half to three minutes. It is usual to take the pulse as the temperature is taken.

The axilla, or armpit, is also a suitable place in which to take the temperature. The thermometer is inserted as shown in the left-hand photograph, and held in position as shown right. Leave the thermometer there for three minutes (see page 36).

Occasionally the temperature is taken in the groin. The thermometer is laid in the groin, bulb down, and the leg bent up to keep it in contact with the flesh (see page 36).

The most accurate temperature recording, and therefore in some ways the best, is in the rectum, or back passage. This method is always used for babies and young children. The thermometer should be dipped in vaseline, and then the bulb gently inserted as shown in the photograph above. It should be held in position for three minutes (see pages 36-37).

size, shape, and consistency of swellings are best mapped out with the finger-tips. Vibrations and movement of the chest wall are felt with the flat of the hand. The pulse at the wrist and the impulse of the beating heart on the chest are also felt by these exploring fingers. The abdomen is carefully examined in a similar manner. The skin itself is felt for its condition.

PERCUSSION

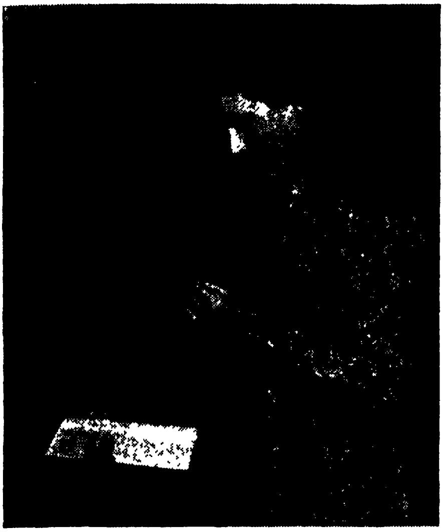
Percussion is perhaps an unfamiliar word to you, but there are probably very few people who have not had their chests tapped by a doctor, at some time or another. This tapping is called percussion and it produces sound in exactly the same way as a drumstick hitting a drum to produce a note. By so percussing the chest, the doctor's fingers are used as drumsticks, the patient's chest being the drum. The doctor listens with well-practised ear to the note that is produced. From the nature of this percussion note he can tell whether the contents of the chest are normal or not—whether the drum is nice and resonant, for example, or by reason of some solid mass inside it the resonance is lost, and a dull, flat note is obtained.

Percussion is a specialized method of examination, which can only be made by a trained doctor. Even more specialized is auscultation. Every one has seen a doctor take out of his pocket a curious instrument possessing plugs which fit into his ears, the other end being applied to various parts of the wall of the chest. This instrument is called a stethoscope, and by its use the doctor listens to, or auscultates, the chest. He usually listens in turn to the sounds of the heart beating, and to the sounds of the air passing in and out of the lungs with the movements of the chest called breathing. These sounds vary very much according to the exact position to which the stethoscope is applied. While, as we have said, only a doctor can make such an examination, he may want the nurse to count the number of times the heart beats per minute, as well as counting it at the pulse in the wrist. In such a case he would give instructions how it should be done. But it is important that a nurse should know the significance of the doctor's examination and the part she has to play in it.

You will have noticed that these methods of examination use in turn the eyes (inspection), touch (palpation), and hearing in percussion and auscultation. This does not mean the doctor ignores taste and smell, the latter which is often very useful to him. Thus we see that the examination of the patient consists of bringing into play all the five senses backed by experience and judgment—all focused on the patient.

DIAGNOSIS

With a history of the patient's symptoms, and a collection of observations or signs, the doctor has a lot of facts at his disposal. These he must arrange and understand. Different possible interpretations may arise, and he may still feel he has insufficient evidence to give a verdict on the case before him. If that is so he will arrange for special investigations to be done. A special investigation should perhaps be termed a specialized investigation, for it is an observation just like the others we have mentioned, but one which is beyond the reach of the doctor's unaided senses. For example, the doctor finds out many facts when he examines a chest, but his vision cannot penetrate beyond the chest wall. The penetrating beam of an X-ray can do so, and



Don't trust your memory! Record the temperature in a note-book, if you are not keeping a temperature chart, before you put the thermometer away (see page 37).

moreover, such penetration can be made visible by its reaction on special chemical material on a screen or photographic plate placed in front of the patient's chest. Such a special investigation will reveal things necessarily unseen before.

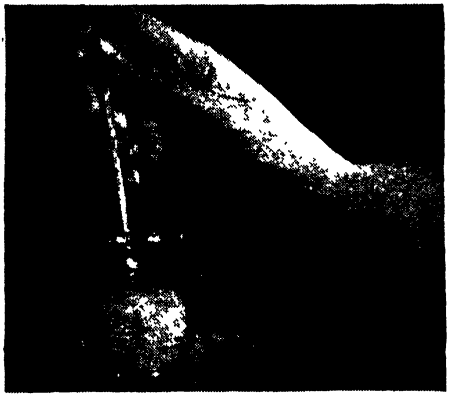
Many tests have been devised on the blood, and the accurate measuring of the functions of various organs. Thus, if the doctor suspects disease of an organ, such as the kidney, he will have these special tests performed to see if it is working properly.

THE NURSE'S PART

The part played by a nurse in the performance of these tests is often considerable. For example, in the collection and indeed, in the testing also of samples of urine a nurse can be of great assistance. This will be dealt with later on. You will notice that in all these specialized observations the nurse has her part to play, and again it must be stressed that to do it well and intelligently, she should understand and co-operate in the work which the doctor is doing.

With all these facts now at his disposal one might be tempted to visualize the doctor as a man lost in a sea of facts, wondering what they all mean! This is the time therefore to point out very emphatically that it is not the number of facts that matters—it is their importance. Two important facts are worth more than a thousand superfluous ones. In many cases the doctor can derive all he wants from a short and quick examination without any special investigations. What a confusion there would be if every one with a cold in the head had X-rays and blood tests done by the dozen! Obviously the situation demands the use of common sense to redeem it from becoming a medical nightmare to both the patient and the doctor.

The doctor uses the facts he has found to reach what he calls a diagnosis. This word means "a thorough knowledge," and until this stage has been reached the case is still in an



When you have finished with the thermometer, put it away in a jar containing weak carbolic solution and packed at the bottom with cotton wool to prevent the bulb from breaking (see page 37).

An ordinary type of feeding cup (*see page 41*).

unsatisfactory state. Treatment is based on diagnosis. Imagine a jigsaw puzzle with all the pieces mixed—these are the symptoms and signs. Put together correctly they produce a quite unexpected picture, the disease picture—which is the completed diagnosis, and the basis of further action, especially treatment. To treat an isolated symptom would be like looking at one piece of the jigsaw and ignoring the importance of the others in making the picture Imagine a human life depending on the correct piecing together of the pieces of the puzzle, as it so often does in sickness, and the importance of diagnosis, or thorough knowledge, becomes clear.

There is one important lesson to be learnt from this. It is that treatment may have to be delayed until a diagnosis is arrived at. During this time both nurse and patient, particularly the latter, may become impatient for something to be done. This is natural, but we now see how wrong it is to commence an important course of treatment without a diagnosis. And it is a nurse's duty to help tide over such a period of unrest. Very often, too, time is the best special investigation of all. For example, in many diseases a rash appears in a day or two. A wait for this to appear may be the easiest way of completing the picture of a diagnosis. Of course, this is not by any means always justifiable. Such an example brings into relief, however, the important part the nurse may take in diagnosis by her accurate observation of a rash, the day of appearance, whereabouts it commenced, etc.

If you were asked what it is you most want to know about a sick person, in all probability you would answer: "It's the future that worries me. What is going to happen to him?" This outlook into the future is termed by doctors, prognosis. Probably few people have ever heard this word, and yet it sums up the whole importance of a doctor's art. For his treatment is included in it. "Is it serious, doctor?" is a common question for a mother to ask a doctor, even perhaps after his explanation as to what is the matter. A doctor would say the same thing in the words: "Is the prognosis bad?"

The future of a sick man is governed by two great considerations—his own powers of recovery, and factors in his surroundings which aid this power. The first is very important indeed, and the wise doctor knows it. In certain diseases it is a more vital factor in recovery than any elaborate form of treatment. Hippocrates—the greatest physician of all time—first described this remarkable power of the body to heal itself. He called it the "natural healing power" of the body, and advised all good doctors to *do nothing to interfere with it.* This brings us to the realization that it is possible to give too much treatment as well as too little, and that by it recovery may be actually delayed, rather than hastened.

The natural healing power of the body then is an important factor, but by no means the whole story. In many diseases it fails. Then other factors come to bear—and these outside aids to healing constitute what you and I know as treatment.

THE DIFFICULT PATIENT

Now in treatment, nursing, in many cases, takes the place of first importance, and will continue to do so, however great are the advances in medical science. And this for two reasons—not only does a good nurse apply a technique in aiding the natural healing power in its work, but she disciplines the patient and relatives in what *not* to do. Until the end of time invalids will want to do silly things. It is only natural. Illness blunts the edge of judgment, and increases irritability, and a wise man becomes a fool under its thrall. It is sometimes a nurse's most difficult job, thwarting the patient's tedious, monotonous desire to harm himself!

Variety of disease of necessity produces variety in treatment. In a disease known to end well, the natural healing powers about which we spoke are given as much rein as possible. But in a disease which has a poor outlook, quite drastic measures of treatment may be justified. If the site of disease can be removed from the patient's body, this calls for surgical treatment. So treatment can be applied to (*a*) removing the cause—the most satisfactory; (*b*) alleviating distress, because it is impossible sometimes to remove the cause, and hoping for the power of healing to alter the course of the disease. In the case of some diseases this may give a justifiable hope of recovery. Lastly (*c*), the preservation of masterly inactivity. This does not mean doing nothing, as patients, and even more relatives, are apt to presume. It means watching carefully for the development of any sign or symptom, which can be helped; aiding by general nursing measures the comfort

Feeding a patient by means of a feeding cup. The spout of the cup is placed between the lips and tilted to the required angle. Make sure the liquid is a suitable temperature (see page 41).

of the patient; watching for and forestalling any complication. This expectant treatment is not dramatic, and therefore has received the buffets of scorn. But it justifies itself in its successful outcome.

Let us now lay out in brief the general plan of treatment.

(1) **General Management of the Patient.**—This is placed first, because, as has been emphasized, it is often of greatest importance. Perhaps this helps to make the home nurse realize the importance of her task.

Under the term general management one includes the daily routine of the patient. How must this be altered in order to let his healing power work to its best advantage? Rest in bed, and his control there; the number of hours up in a chair or walking—such and many other matters come under general management.

(2) **Diet.**—The importance of this factor is obvious. Here we shall not enter into a discussion of it. Two general points may be raised, however. One—always pay attention to the patient's likes and dislikes on the matter; and the other—make simplicity a corner stone of its planning.

(3) **Medicines.**—It has been said of medicines that they "sometimes cure, often relieve, and always console." Such a verdict may fairly sum up their position in treatment, with perhaps a modification nowadays as regards their consoling properties. Of recent years the pendulum has swung rather far against the bottle of medicine. In this matter one must keep a sense of proportion. Doctors deplore the patient who refuses to take drugs, as much as the patient who is not happy without six different kinds of medicine!

Serum Treatment.—In some diseases, such as diphtheria, the invading germ elaborates a poison or toxin, which produces an antipoison or antitoxin from the defensive tissues of the body. Fluid blood serum containing this antitoxin is therefore invaluable in treatment and produces dramatic cures if used early. Other germs or bacteria besides that of diphtheria are similarly helped by this kind of treatment, but in all it is of vital importance that the serum should be given early in the disease. Special sera are also used in other ways in treatment.

Physiotherapy. — This long word simply means treatment by those elements studied by the science of physics, which includes mechanical means, heat, light and electricity. Massage and exercises, and radiant heat are examples. Nearly all such treatments are complex and need especially trained people to give them. They fall into the realm of the general nurse only in so far as she may have to supervise some methods.

Psychological Treatment.—It has always been recognized that the mind plays an important part in disease. We need only think of the way fear makes our hearts palpitate to appreciate how close is the tie between body and mind. Symptoms or unpleasant sensations are often produced simply by the mind being strained—and treatment of the mind relieves the patient. A doctor must always use psychological treatment as well as other methods. To gain the confidence of his patient is his first step in this direction. Of recent years psychology has been intensively studied with very controversial results, but its uses are found to be more and more extensive.

In some ways a nurse, in constant contact with the patient, has a peculiar responsibility in this realm, both in reporting important confidences to the doctor—and only the doctor—and also in carrying on the good work of

In fever cases it is important to keep the mouth clean. Soft clean rag wrapped round an orange stick and soaked in glycerine and borax is used. The whole inside of the mouth is gently cleansed with this, wiping from the back of the mouth forward (see pages 41-42).

persuasion or suggestion which has been inaugurated by him at his treatments. This involves understanding to some extent what the goal of treatment really is, on which subject discussion with him is often very helpful.

Surgical Treatment.—This last is a line of treatment with which we are all acquainted. In certain cases it is, of course, the most effective of all—that is where the offending organ can be taken away. Such treatment, as in acute appendicitis, is radical and results in permanent cure. Unfortunately, some organs of the body cannot be taken out without consequent harm. This limits surgery, which has however advanced in many directions far beyond this simple cutting out of diseased organs. For example, operations are now done on the nerves controlling different organs, such as the heart or womb, so that inefficient and painful working is made smooth and painless. In this direction surgery undoubtedly has a great future.

Surgical operations are often divided into two main types, major and minor. The word major applies to big operations. The nursing of such cases after operation is often difficult and can only be done by a trained nurse. With minor operations such as incisions of boils and abscesses, however, this is not so. The dressings afterwards may well be looked after perfectly efficiently by the home nurse.

This very brief outline of the way in which a doctor thinks of disease, will, it is hoped, not only help the home nurse to understand his method of approach to a patient, but give her a greater realization of her part in the scheme of healing.

CHAPTER III

NURSING A CASE OF FEVER

by K. D. KEELE, M.D., M.R.C.P.

(*See also Part II. Chapter II. Common Infectious Complaints*)

THE fact that the temperature of the human body is constant within narrow limits is so well known as to be a commonplace. Like many so-called commonplaces it is a marvellous fact.

Many animals vary their temperature widely, depending on that of the air around them. This applies to such animals as frogs and snakes. The class of creatures called mammals, however, are all warm-blooded, and an elaborate apparatus is provided for retaining or losing heat as necessary so that the blood should keep at a constant temperature. Man is the most highly developed of these warm-blooded animals.

The temperature of the body taken at any moment is the result of a balance between the amount of heat being created, and the amount lost. If the amount produced is increased—or the amount lost diminished—then the temperature is raised and fever is present.

HOW BODY HEAT ARISES

Heat is produced in the body by the cells. These may be looked upon as microscopic fires, for they burn fuel by using air—just like a fire in a grate. Of course, this is done in a special fashion at a lower temperature—nevertheless this burning of oxygen of the air produces heat all over the body. These little fires burn quickest where activity is greatest—that is in the muscles, and also in certain other tissues such as the liver. Blood permeates all organs, and by it heat is carried from one part of the body to another. Amongst many other functions the blood vessels of the body may be thought of as its hot-water pipe system.

Cells burn fuel and make heat. The fuel they burn is a starchy substance which comes from the food taken. But the body may also be heated by putting hot fluids into it, or by warming it from the outside—as with a hot bath.

THE IMPORTANCE OF SWEATING

Heat is lost from the body in many ways, but by far the most important is through the skin, and here the apparatus for regulating heat loss is situated. Just as a hot radiator radiates heat into the room, so the body radiates through the skin. Moving air also takes away heat—hot air rises and cold air replaces it. Thus a continuous loss of heat takes place by the flow of air created by the heat of the body. But sweating is the most important method by which the body loses heat. Sweat glands in the skin pour out their watery secretion, which evaporates. This process takes up heat from beneath—and with a dry air the more the skin sweats the more heat is lost.

Sweating is always going on, though we are unaware of it. The minute drops of sweat are dried by evaporation before they become visible to us. It is only when this process is excessive that sweat becomes visible. From these facts it becomes clear how dangerous it is to sit in a draught when one is very hot, for the amount of heat lost may be greater than the body intended, and it becomes chilled. And chilling lowers its resistance to invasion by germs. We see this clearly in diseases which have been named "a cold," or "a chill," and in influenza.

REGULATION OF BODY HEAT

Regulation of the temperature of the body is, then, through the apparatus of heat production (chiefly muscles) and heat loss (the skin and its blood vessels). This intricate balancing is governed by a special centre deep in the brain—the heat centre. This works on skin, muscles and blood vessels, through a network of nerves. If the body is cold, this centre relays messages which result in the blood vessels of the skin contracting, so that little blood comes to the surface, and the muscles may contract rhythmically; this we call shivering. We thus see why "pale and shivering" describes a cold person. If the body temperature is raised by exercise, and heat must be lost, then blood vessels dilate and the skin becomes pink from the blood in it. Sweat glands get to work and the skin becomes moist.

In fever this regulating mechanism is upset. The centre becomes "geared up," more heat is created, and less lost, so that body temperature rises. The skin is dry and pale, and yet shivering is going on. This combination, when it is noticed, should always give rise to the suspicion that fever is present.

In the healthy body there is naturally slight variation of temperature as measured by a clinical thermometer. This instrument is simply a thermometer adapted for use in taking the temperature of the body. It is graded between 95 degrees and 110 degrees Fahrenheit. Normal body temperature is about 98.4 degrees Fahrenheit. During the day there is a change. At 6 a.m. the body activity is at its lowest and so is the temperature. At 6 p.m. it reaches its highest. This difference will be from about 97.6 degrees to 99.0 degrees Fahrenheit. From this it will be noted that though 99.0 degrees Fahrenheit may be normal in the evening, it is abnormal if found in the morning. The temperature is, of course, raised by bodily activity and excitement. It also rises after a meal. These changes, however, only last a very short time. Conversely, the temperature falls when one is thoroughly chilled, or depressed, or at a low level of activity on account of hunger.

ABNORMAL TEMPERATURES

The grades of body temperature can now be tabulated as taken in the mouth.

Subnormal—below 97.6 degrees Fahrenheit.
Normal—97.6 degrees to 99.0 degrees Fahrenheit.
Fever (pyrexia)—99.0 degrees to 104 degrees Fahrenheit.
Hyperpyrexia—105 degrees Fahrenheit upwards.

A temperature of above 110 degrees Fahrenheit is incompatible with life. The word pyrexia is used to indicate simply a state of heat regardless of the cause. For example, after exercise there is pyrexia—but *not* a fever. This latter word is used to describe the rise of temperature in disease.

Fever is a condition of the body in which the temperature is raised, amongst other changes. In the previous

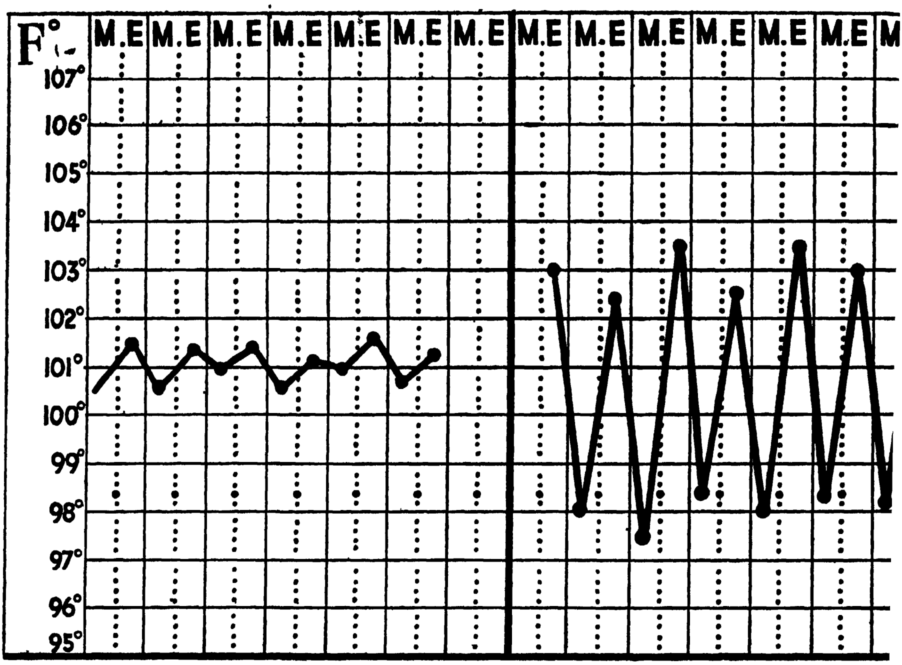


Fig. 1. *Chart* 1, *Persistent Fever; Chart* 2, *Intermittent*

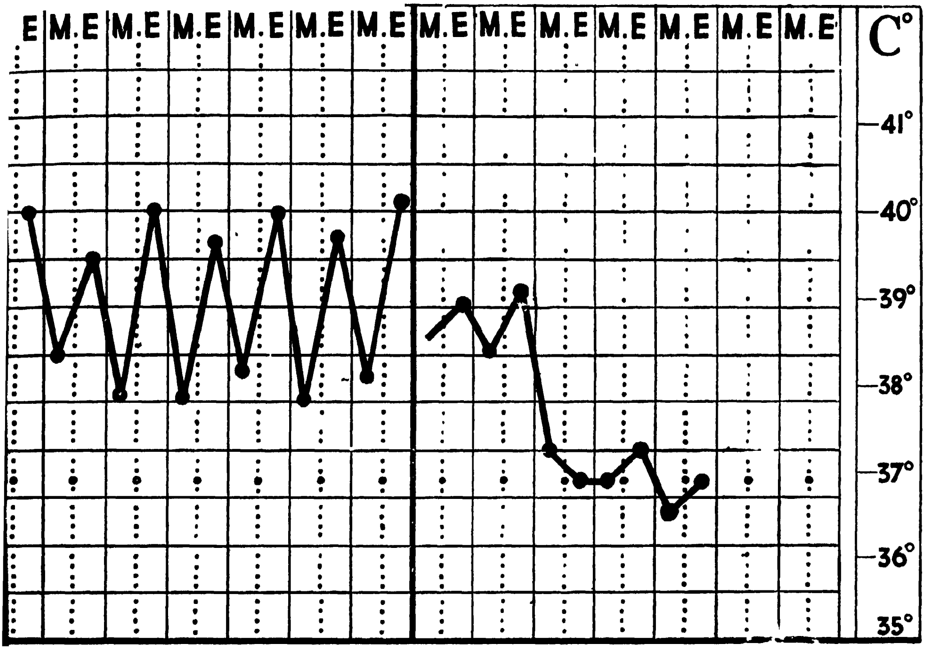
chapter we noted how common it was for the body to be invaded by germs, with a resulting fever, as in scarlet fever or diphtheria. The toxins or poisons produced by these germs result in bodily reactions of which fever constitutes one. This reaction is, up to a point, beneficial—but when it enters hyperpyrexial levels, e.g., 105 degrees Fahrenheit, then it becomes a danger in itself, and treatment must be instituted to control it.

FEVERISH CONDITIONS

In many fevers the normal variation of temperature is accentuated, so that there may be a subnormal temperature in the morning rising to a considerable fever in the evening. The earlier in the day this rise takes place, the worse is the condition—and conversely the later the better. If the rise is in the morning it follows that this is of more significance than a rise at evening time.

If the fever comes on suddenly and severely, then the patient feels intensely cold. The skin pales and violent shivering takes place. So violent is this that the teeth chatter, and the limbs and whole body may shake. The attack is known as a rigor. During a rigor the temperature is being rapidly geared up, and rises if measured by the thermometer. This cold phase may follow the sudden release into the blood of poisonous toxins, and it is often followed by a hot stage, during which the heat loss mechanism of flushing and sweating comes into play. Following this stage the patient feels much more comfortable.

During the rigor the patient may be made a little easier with the aid of hot-water bottles carefully placed among blankets. Hot drinks will also be welcome. Such measures will not affect the final level to which the temperature rises but they will relieve some of his



Fever; Chart 3, *Remittent Fever; Chart* 4, *Crisis.*

feverish discomfort and exhaustion.

By charting temperatures in the way we shall describe later, different forms of fever are described. The fever may remain as in Fig. 1, Chart 1 where there is little variation from morning to evening. Such a chart sometimes occurs in pneumonia. Chart 3 shows a remittent fever, where it is variable, but persists. This type of chart occurs in many acute infections. These diseases may also produce an intermittent type of fever. In Chart 2 the temperature swings back to normal for a few hours but rapidly swings high again. Fever may subside in different ways, either quickly or slowly. A crisis (Chart 4) is a very rapid fall, during a few hours. A patient in a crisis sweats very profusely. He may be very exhausted from his previous course of fever, and may fall into a deep sleep. When he awakes the patient has a feeling of great relief. A contrasting slow fall of fever is called lysis. It is nothing like so dramatic.

Any patient with fever should be carefully watched for accompanying symptoms which give a guide as to progress. Some of these symptoms are the result of the raised temperature itself, some are caused by the poisonous toxins. These latter symptoms distinguish the different fevers one from another. The main symptoms common to most fevers are referable to the digestive and nervous system.

PULSE AND RESPIRATION IN FEVER

The tongue becomes furred, and the appetite poor. Often there is vomiting in the early days. In a severe case the tongue may become very furred and dry—even turning brown. The bowels become constipated in all fevers. In short, all the processes of digestion and absorption of food are slowed up. The heart's rate of beating always increases with a fever, so that the pulse

Arranging the draw sheet. An ordinary cotton sheet folded lengthways will do if necessary. Tuck in one end; then pull the sheet smoothly over the bed as shown. The long end should be folded up neatly into pleats and then, it also, should be tucked in (*see page* 38).

rate, felt at the wrist, is rapid. This increase in rate is usually about ten beats per minute, for every degree rise of temperature. The normal pulse rate is about seventy-two to the minute. The breathing or respiration rate also quickens in any fever. This condition is particularly marked if the fever chiefly affects the lungs, as in the case of pneumonia.

The kidneys produce small quantities of urine in fever, especially in the hot stage when so much moisture is being lost through the skin by sweating. The small amount of urine that is passed is very concentrated and is therefore of a high colour. The nervous system expresses its disturbance often in the mental irritability which is so common in fever. Headache is often an early symptom. Later the patient may become drowsy and slow, wanting to be left alone in a dreamy state. Excitement, however, may develop, and the patient may make efforts to get out of bed, or resist the attempts of his nurse to do things for him. This state is known as delirium, in which sleep is poor also and the patient mutters meaningless words prompted by his semi-waking dreams. These symptoms in fever offer some of the most difficult problems to the nurse. Their onset must be quickly observed and the sooner their cause is dealt with and, if possible, removed, the better.

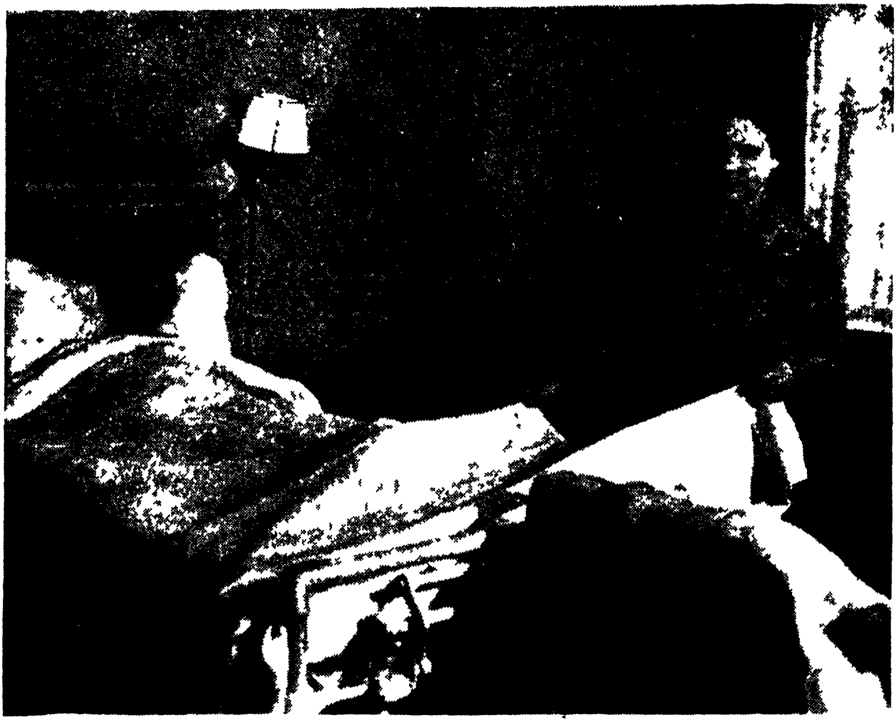
The clinical thermometer measures the temperature of the substance round its bulb, which is full of mercury. This has been adjusted so that it expands, its long threadlike end creeping up the thermometer a measured distance for each fraction of a degree rise in temperature. Often there are five marks between each single degree. Each fraction, therefore, represents one-fifth or 0.2 of a degree. At 98.4 there is a special mark, indicating this as the normal temperature. As we have seen, however, normal temperature varies at different times of the day from 97.6 to 99.0 degrees Fahrenheit, so that this mark is of only limited use. It acts as a guide to one in finding one's way, so to speak, among the gradations on the thermometer.

USING A THERMOMETER

Before taking the temperature, the thermometer should be washed in cold water (remember hot water might break it), wiped dry and shaken down. The thread of mercury is so designed that when it has risen to register a temperature it cannot fall back when the temperature drops again. Thus it stays in the same place and can be read by the observer at leisure. The column of mercury has to be shaken down again into the bulb before any further reading is taken. This should be done by taking the top end of the thermometer between finger and thumb and sharply flicking by a downward movement of the wrist. The thermometer must read below 97 degrees Fahrenheit before being used.

Usually the temperature is taken in the mouth. It should be placed in on the slant, the bulb being laid underneath

To change the draw sheet so that a fresh part is beneath the patient, pull out some of the pleated long end, and either rolling the patient or lifting her, pull on the short end so that part of the long clean end comes under the patient, and then tuck in neatly again.



Bed Making: *Double or fold the first blanket at the foot of the bed and also leave a big fold of the top sheet as shown Then top sheet and blanket can be turned from the bottom of the bed to the top, the new " tops " still being perfectly clean* (*see page* 39).

the tongue on one side, the lips being closed round the stem to keep it in position It should never be bitten between he teeth The thermometer should be retained for a varying period according to whether it is a half-minute, one-, or two-minute instrument. It is, however, always wise to keep the half-minute thermometer in for a full minute as it often takes a little longer than the advertised time for the full rise to take place. Where strict accuracy is desired, as in some special hospitals, the thermometers are always left in for five minutes.

It is important to remember that mouth temperature may be considerably raised after a hot drink and lowered after a cold one. The mouth method of taking the temperature should never be attempted in infants and young children who are frightened and incapable of co-operating.

The axilla or armpit is another suitable place for taking the temperature. The skin should be dried, the thermometer inserted horizontally, and the arm bent across the chest so that the hand lies on the opposite shoulder. The thermometer should be left in for three minutes.

Sometimes the groin may be used, the thermometer being laid in the groin, bulb down, and the leg bent up so that the flesh is quite closely in contact with it.

The back passage or rectum is, from the point of view of accuracy, the best place in which to take the temperature. Obviously convenience often dictates against it. It should, however, be used in infants where the mouth is inadvisable. The rectum and lower bowel should be empty of all fæces or waste matter. The thermometer should be dipped in vaseline and inserted gently into the rectum for one to one and a half inches and held in position for two minutes.

Whichever method of taking a temperature is decided upon, it must be used constantly. For the temperature varies somewhat with the situation. It is highest in the rectum, then in the mouth, and lower by one to one and a half degrees in the axilla and groin.

After taking the temperature the thermometer should be washed and put in a jar containing weak carbolic (one in forty) or cold water only, with a piece of cotton wool packed into the bottom. This prevents the bulb breaking when put away.

CHARTING THE TEMPERATURE

When taken, the temperature should be charted. Charts are produced with spaces for temperature, pulse and respiration rates. In acute illnesses a four-hourly chart is used. That is to say, the temperature is taken at four-hourly intervals—six times throughout the twenty-four hours. In less severe cases a morning and evening temperature is sufficient. The temperature figure should be carefully plotted and put in its position as a small dot. Lines may be made joining one reading with the next. These should be straight and not in flourishing curves which often

Bed Making: *Now spread the second blanket over the first folded blanket and sheet as shown above. After replacing all the blankets finish off with a bedspread.*

mislead. Examples of charts and their marking are best understood from a glance at Fig. 1. The pulse and respiration rates are described in Chapters IV and IX respectively.

Just as there are features common to most fevers, so are the outlines of treatment and nursing based on similar principles. In any individual case, therefore, treatment resolves itself into (*a*) the general nursing and management and (*b*) the special specific remedies. It is with the first part we are now concerned. Let us consider that we are dealing with a case of considerable prolonged fever.

The patient must, of course, be put to bed, and on absolute rest as far as possible. Absolute rest means that he does literally nothing. He must be fed by the nurse, a bed-pan and urine bottle must be used, he must have his bed made whilst in it, he may not read a book or have visitors. He may, however, be read to.

MAKING THE PATIENT'S BED

We have already considered the importance of the arrangement of the room as regards furniture, temperature, ventilation. The bed deserves further consideration.

A single bed is easiest for nursing, for the patient can be approached equally easily from both sides. It is difficult to reach across a double bed. The mattress should be firm, so that there is no dip into which the patient sags, making it difficult for him or the nurse to raise his body. It is good to have the bed easily movable on quiet well-oiled castors. The position of the bed is described in Chapter I. It should be with its head to a wall, out of draughts.

In making up the bed, sacking is often laid over the spring mattress and tied down with tapes at the corners. A firm hair mattress is best above this, covered by an underblanket. Feather beds are never advisable as they are too hot, and add unnecessarily to the difficulties of nursing.

Over the usual linen or cotton undersheet, a mackintosh sheet may be put, if there is risk of soiling. Over this a draw sheet of cotton may be tucked in smoothly. It is called a draw sheet since its length should enable one to draw it from one side to the other periodically, retucking in the ends, so substituting a fresh, clean sheet in contact with the patient's body whenever it is needed.

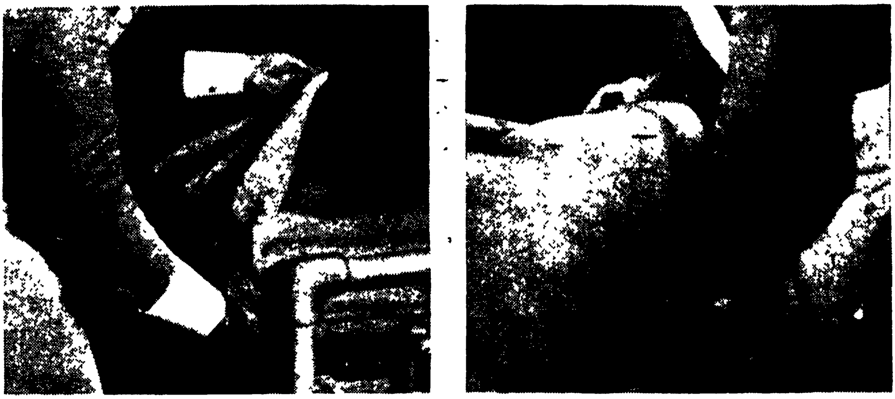
Next, pillows are put in place, the number depending partly on the comfort of the patient—two is usual. Feather pillows are best if possible.

WARMTH, BUT NOT WEIGHT

A top sheet of linen or cotton tucked in well at the sides, and two light but warm blankets are the next additions. Blankets must not be multiplied for the sake of warmth, especially if heavy; an eiderdown is reasonable for the purpose. But with properly regulated temperature in the room, no further addition for warmth will need to be made. The final counterpane is a concession to the eye. A washable, light bedspread is best from the housewife's point of view. However careful, the top covering of an invalid's bed is bound to get soiled.

Making the bed is an important part of routine treatment of a case of fever. Let us imagine the home nurse approaching her patient in the morning or evening (for it must be done twice daily) for this purpose. In this case we will presume that the patient is well enough to be moved out of bed.

First the room must be warm, draughts excluded, and the patient comfortably ensconced in the easy chair before the fire. Then the bed is stripped, by doubling the clothes back and folding them over the back of a chair placed at the end of the bed. The mattress should then be turned. In re-making the bed two golden rules regarding undersheet, draw sheet and mackintosh, if used, are (1) make them smooth and tight, (2) get rid of all crumbs. The patient who lies all day in bed is very sensitive to small irregularities and such irregularities may produce injury to the skin, which in a long case may turn into a broken skin or bed-sore—a dreaded complication which should be avoided.



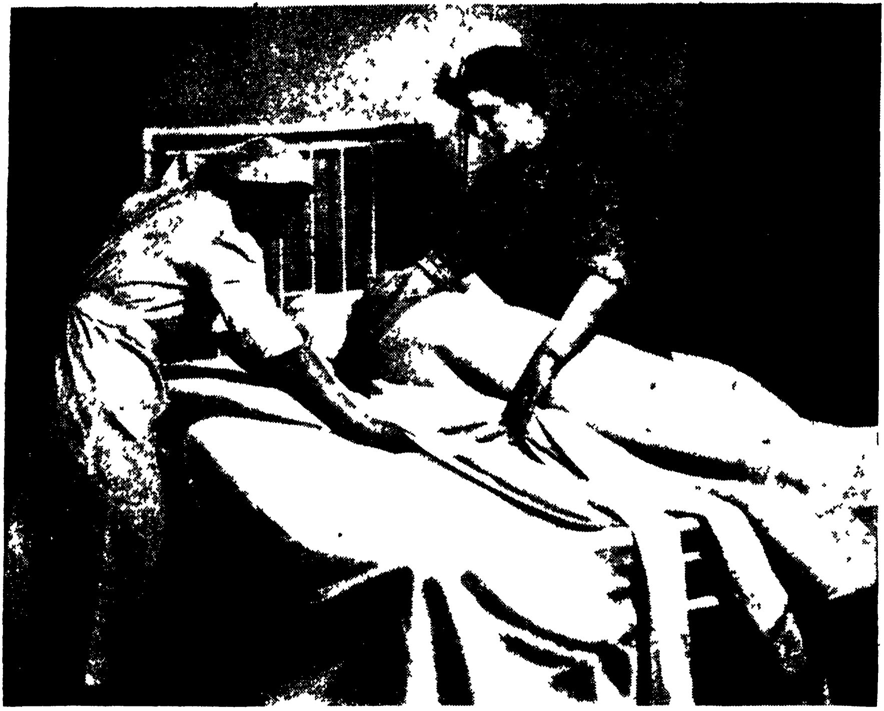
Bed Making: *The above two photographs show how to "envelope" the corners of blankets.*

The draw sheet, usually made by doubling an ordinary sheet, is then laid across the mackintosh sheet, in such a way that one end just tucks in while there is a lot of the other to spare. This is tucked into the other side after being arranged in pleated folds. To change the draw sheet it is necessary to pull on the short end, so unfolding the long end, and using a fresh sheet to cover the bed. Draw sheets and mackintoshes are sometimes uncomfortable and resented by the patient, and with the doctor's permission may on occasion be dispensed with.

With the pillows well shaken out and arranged, the patient gets back into bed. Top sheet and blankets are then replaced. It is usual to double the first blanket and leave a wide fold of the top sheet at the foot of the bed as in the illustration, the advantage being that if it is wished one can reverse top sheet and blanket, the new top ends being still clean. The counterpane or quilt completes the process, being tucked under the mattress at the foot of the bed. A neat way of making the corners, both of blankets and counterpane, is to "envelope" them—a simple process most easily described in the above illustration.

CHANGING THE BOTTOM SHEET

If the patient is unable to get out of bed for bed making, then two people are necessary. The new difficulty mainly affects, of course, the undersheet and draw sheet, if used. The principle of overcoming this difficulty is to roll the patient first to one side, roll up the dirty sheet close to him, and then unroll the new clean one into position, tucking it in at the side. Next the patient is gently rolled to the opposite side. He now lies on the clean sheet. The dirty sheet can be removed, and the clean one further unrolled to



Bed Making: *To change a bottom sheet if the patient remains in the bed, roll the patient to one side, roll the dirty sheet up close to her and then unroll the clean one into position.*

the opposite side and tucked in. In rolling the patient he should, of course, be disturbed as little as possible. Arms across chest, head to the side towards which he is being turned, is the best position for him. If a draw sheet is being used, this may be changed in a similar manner.

It is important during all bed-making routine to disturb the patient as little as possible, and to avoid any draughts or cold air getting to him. He should always be covered. For example, if changing the top sheet with the patient in bed, the clean one warmed should be laid over the dirty one and one blanket. The dirty sheet is stripped off *under* the blanket and clean one which is left in position. If able to get out of bed the patient must be clad in a warm dressing-gown and slippers, and a blanket or rug should be put round him.

Food.—We turn to the question of feeding the feverish patient. We have seen that a tendency to vomiting and a distaste for food is present in all such sick people. In spite of this disadvantage it is even more necessary than in health for him to take adequate nourishment. Fortunately, he will nearly always be thirsty and fluids are the means whereby food can be taken. Fluids must be given, four pints daily for an adult, in two-hourly feeds throughout the day, and at night if sleep is disturbed. Sugar, in particular glucose, is the fuel which is used up in fever and the more it is supplied in the drinks the better. As a food supplying proteins and fats, milk is very important. Milk is a complete food for the young of animals, and contains all the necessary food elements in easily digestible form. Not every one finds it palatable, however, and it may give rise to flatulent discomfort. This should be watched for, and to begin with, the milk should be diluted with equal parts of barley water or soda water. The latter, in particular, produces a sharp tang in the mouth which is pleasant to the dry-mouthed, feverish patient.

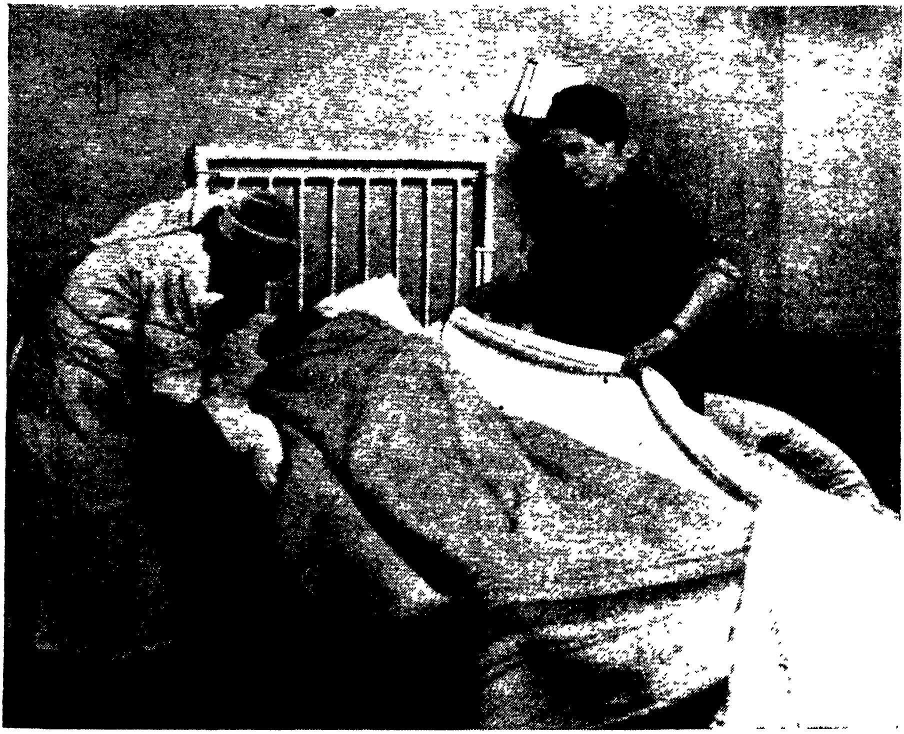
A full and correct diet sheet for a fever patient will be found in "Feeding the Invalid," which is Chapter II, Part II.

In exhausted patients, unable to feed themselves, fluids should be given from a feeding cup. First make sure that the feed is of the right temperature—that is, that it will not shock the patient by being too hot or cold—then, raising the head with one hand, the spout of the cup is placed between the lips and the cup tilted to the required angle for him to take the food.

AFTER FEEDING

As the fever subsides the stomach is better able to deal with food. Always we want the feverish patient to absorb as much nourishment as possible. Note that the adage "starve a fever" is thoroughly misleading and quite wrong. The fever patient must be fed *with the right foods.*

An important part of nursing is keeping the mouth clean. In fever



Bed Making: *Now gently roll the patient to the other side, strip off the dirty sheet, finish unrolling the clean sheet and tuck in. Always keep the patient covered with a blanket as shown while making the bed. It is important that she should not be chilled.*

Bed Making: *To change a top sheet if the patient is too ill to be moved and must remain in bed, strip the bed except for the dirty sheet and one blanket, which should be untucked. Over these spread the clean sheet, which should be warmed.*

the mouth gets dry, the tongue dirty, and collections of food and secretion are found round the teeth. The natural saliva, which in health washes the mouth out regularly, is greatly diminished. Thus, after feeds, the mouth must be carefully cleaned, and, if necessary, before also. It is best to wrap soft, clean rag round a finger or an orange stick and soak it in glycerine of borax or peroxide of hydrogen. This should be passed to the back of the mouth, the cheeks, roof of mouth and gums, and teeth, wiping from behind forwards, and the tongue from side to side to prevent retching. The whole procedure can be assisted by giving the patient a mouth-wash of diluted peroxide of hydrogen. Cleaning the mouth may be painful to the patient, and particular care should be taken at the corners of the lips, which are often cracked.

PRESSURE POINTS

The feverish patient may be dazed and insensitive, so that he tends to lie for long periods in one position. Pressure points of the body have to be learnt. They are those parts which, being exposed to the brunt of bearing the weight of the body, get most wear. Here it is that the skin becomes chafed and sore first. Naturally, the commonest region is the back, particularly the buttocks. Heels, and elbows also, have to be carefully observed in this connexion, shoulders and knees less commonly. We have already emphasized the importance of smooth bed-clothes in this respect. Cleanliness of the skin is also of importance, and the buttocks may be hardened by rubbing in a little surgical spirit, finally dusting them with talcum powder (best done after the daily bath). This prevents soreness appearing. Elbows are often uncomfortable and may be protected similarly or by lightly bandaging them up in cotton wool. Placing the feet on a soft pillow so that the heels lie clear of the mattress is a useful method for dealing with a sore heel. An air ring to sit on is often a useful addition to the care of the back. Another simple device is a knee pillow which prevents the patient from slipping down. A bolster is best for this purpose, rolled up in a sheet the ends of which are twisted and tucked under the mattress at the sides, the whole being placed under the patient's knees. This is useful, particularly in an illness where the sitting posture is allowed or advisable, such as pneumonia, or in any long illness. By preventing slipping it gives comfort to the patient and prevents bed-sores developing. Hot-water bottles are only too common as a cause of burns to patients. For this reason they should not be put into immediate and direct contact with a patient's skin, but *outside* the sheet or blanket covering him.

BATHING AND SPONGING

Water is a very useful substance in treating a feverish patient, used either

Bed Making: *Now strip off the dirty sheet underneath the blanket and clean sheet, then strip off the blanket as shown in the photograph above and quickly spread it again over the clean sheet. Finish making the bed in the ordinary way (see page 40).*

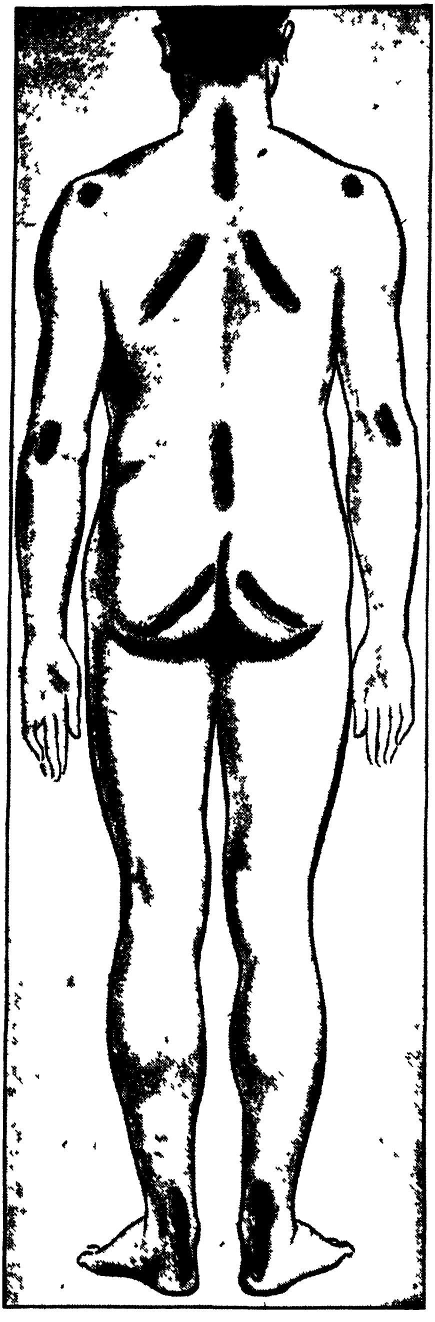


Fig. 2. *Pressure points are indicated in the diagram above. The buttocks are the commonest spots; heels and elbows also suffer.*

internally or externally. Outside the body it is used for cleaning the skin, to reduce the temperature, and to soothe the patient.

A bath is often very welcome and soothing to a feverish patient. If the doctor allows him to go to the bathroom for it then so much the better.

See that everything is ready for the patient, and that, if he is left to bath himself, the bathroom door is *not* locked on the inside, so that if he feels faint, the nurse may get to him. It is always as well to be within easy calling distance. The bath may be specified by the doctor as cold (45 to 65 degrees Fahrenheit), cool (65 to 80 degrees Fahrenheit), tepid (80 to 90 degrees Fahrenheit), warm (90 to 100 degrees Fahrenheit), or hot (100 to 110 degrees Fahrenheit). Getting in and out of a bath is often a difficulty to a person weakened by fever, and it is advisable to help him. It is, of course, usually only the convalescent, or slightly febrile patient who will be allowed to bath himself. For those who have to be bathed in bed the blanket bath is the method which will best be used.

BLANKET BATHING

First, draughts must be completely excluded, by closing the window, arranging screens, etc. Next everything necessary should be arranged on the table by the bedside: a good-sized basin of water at about 110 degrees Fahrenheit (allowing for a few minutes' delay and cooling) with a spare jugful at the same temperature: soap and two flannels (one for the thighs and groins), towels, a nail brush, some surgical spirit and dusting powder for the care of the skin as previously mentioned. The hair should be brushed and the teeth carefully cleaned after the bath. The bed-clothes are then stripped and the warmed blanket placed over the patient (without exposing him to the air, as described in changing the upper sheet). Another blanket may also be placed beneath him. With a towel behind the head the face is washed and dried. In general, the more folds and concavities there are, the more difficult is it to wash a region—and the more care should be taken over such parts. After the face each arm is washed separately, exposing only one at a time. Each part is dried and covered again under the blanket before continuing to the next. Next the chest, and then the abdomen are dealt with. The patient is then usually given the soaped flannel to wash the groins and thighs. Lastly, the legs are each dealt with. When all this is finished there is a good opportunity to treat the skin of the back, heels or elbows with spirit and dusting powder to prevent any sores developing. The patient is turned on his side so that this can be done more easily.

REDUCING FEVER BY SPONGING

In a case of high fever the patient may be made very much more comfortable and the temperature lowered several degrees by using water, either tepid or cold. Tepid water may be used in the form of a bath, particularly in the case of children, or more commonly by sponging. This is peculiarly soothing on its own. It works like massage to the skin, whilst the water evaporating cools it in the same way as sweating does. In fact, the whole procedure might be termed an artificial sweat. Preparation and procedure are substantially similar to that for a blanket bath. It is usual, however, to put a hot-water bottle at the patient's feet, and wrap his head in a cold wet towel. Water at a temperature of 80 to 90 degrees Fahrenheit is used, of course, without soap. If this watercools a little during the process it is not of importance as long as the patient does not look blue or distressed. The face is wiped first and dried, then the other parts in the order of the blanket bath. But after being wiped with moistened sponge, the part is not thoroughly dried, so that the cooling process of evaporation continues. Finally, the patient is rolled on to the side for the back to be done, after which the wet blankets and mackintosh sheet are taken off, and the patient is dried thoroughly, put into warmed pyjamas and tucked comfortably into his bed. The whole sponging should take about twenty minutes. The temperature of the body should fall about 2 to 6 degrees Fahrenheit—a fall of more than this amount is undesirable.

Although sponging may be satisfactorily performed with one large bath sponge the effect may be increased by putting additional sponges under the armpits and in between the legs. Cold sponging is a similar procedure, using water at a temperature of 65 degrees Fahrenheit. Other methods of reducing the temperature are the cold bath—temperature below 65 degrees Fahrenheit, and the cold pack. This consists of wrapping the patient in a sheet wrung out in cold water, below 65 degrees Fahrenheit. The patient is kept in this for ten to fifteen minutes, the temperature being maintained by sprinkling him with cold water at intervals. Afterwards the patient is dried and wrapped in warm blankets. These cold methods are drastic and not commonly advised nowadays. The patient may become shivering and blue during them, and in such case the treatment has to be stopped at once, and heat applied in the form of warm blankets, etc. Never try to give fever reducing treatment of this sort without the doctor's express orders.

It is most important that a patient with a high fever should not get out of bed and expose himself to draughts for the purpose of emptying the bladder or bowels. Nobody likes using bed-pans, and often they must be enforced by strict discipline. The best type of bed-pan is circular, as illustrated.

USING A BED-PAN

Before giving a bed-pan to the patient it should be warmed, either in front of a fire, or by dipping in hot water and drying thoroughly. A comfortable temperature is assured by testing with the hand. The utensil is then covered with a cloth, and taken to the bed. The patient is assisted, if necessary, in his efforts to raise the buttocks off the bed, by slipping one hand under them. The bed-pan is slipped into position from the side. After use it is slipped out, covered and put under the bed while the patient is cleaned, if necessary with towel, or toilet paper, and his clothes arranged. The bed-pan is then removed from the room and emptied. It is best cleaned by being held under running water and thoroughly mopped out, and dried, the mop being kept in antiseptic solution. The bed-pan should be scalded with a boiling hot solution of soda once daily in order to keep it perfectly clean.

With the urinal there is usually no difficulty. It should be warmed and covered with a cloth, and may usually be left to the patient to use it on his own. Afterwards he puts it out, covered, and the nurse comes to remove it. It should be washed in running water and scalded daily in the same way as the bed-pan.

A word of warning—in many conditions, the doctor will want to see the excreta, either the stools or urine. In such a case, or if anything abnormal is noticed about their appearance, or odour, then the specimen should be kept and not thrown away. In this connexion it is important to notice how much urine is passed, and the quantity should be measured in all cases before throwing it away. For this a measured jug or glass must be specially kept. In feverish patients the quantity is always small, and the fluid highly coloured, since it is concentrated. So much fluid is lost by the skin in the form of sweat, that there is relatively little left for the kidney to excrete. Patients who are very ill sometimes lose the ability to perform the act of passing the urine, which remains in the bladder. This is a serious and often missed sign, and it must be watched for by the nurse. It is made all the more easy to miss by virtue of the fact that with the bladder filled to capacity, urine may from time to time force its way past in a trickle or overflow. The bladder may be seen as a fullness or swelling in the middle of the abdomen below the navel, and such a swelling of the bladder should at once be reported to the doctor.

DRUGS IN FEVER

All the measures we have so far described are directed towards the two main objects of keeping the patient comfortable and reducing the temperature, which in itself adds to the comfort of the patient. Medicines given in a fever can be divided into two main groups: those which counteract the cause of the fever, for example, the germs of the disease, and those which combat certain symptoms. As we have seen, some drugs act by reducing the temperature—they are called antipyretic. Often these are nowadays thought inadvisable, since within limits the fever is a beneficial bodily reaction. However, it may be excessive and do

Any one who is seriously ill in bed for any length of time is liable to get bed-sores (see diagram page 44). If elbows get sore, pad them well with cotton wool which must be lightly bandaged to hold it in position as shown here.

harm to the tissues by itself, and so it may become necessary to reduce it. Aspirin is one of the commonest drugs used for this purpose. The temperature is reduced 2 to 3 degrees Fahrenheit in about two hours, but rises again at the end of six hours. With the cooling phase the patient sweats. Other medicines are also used for reducing fever and may be prescribed by the doctor.

STIMULANTS

A third group of medicines in fever is that of the stimulants. Fever is exhausting—and this state may become so marked that delirium may develop, there may be trembling of the hands, the pulse rate quicken excessively and the tongue become very dry. Under such circumstances, stimulants may be found useful. There are many such drugs, but alcohol in some form is the best known, and brandy or whisky the usual way of giving it. A half to one ounce is enough at a time, repeated once or twice during the day. The action is partly on the lining membrane of the mouth and gullet, by the sharp tang of the spirit, and partly on the heart and brain after absorption. It is extremely important, in a patient who is slightly delirious, not to give him enough alcohol to add a state of drunkenness to his delirium. This is, in practice, not so uncommon a thing to happen as you would think, particularly in the case of children.

Other stimulants may be decided on by the doctor. Most of them he will give by injection. In all (including alcohol) the result of each dose is the best guide as to when and how much

One of the parts of the body most likely to be affected by bed-sores is the heels To protect sore heels, first make a "nest" by making a hole in a pad of cotton wool and winding bandage round to make a ring as shown Now lay the ankle and calf on a pillow

The heel is left clean of the pillow and fitted into its "nest" as shown here For extra comfort put another wad of cotton wool behind the ankle.

should be given on the next occasion.

The symptom of sleeplessness is often so prominent in feverish patients that a few words must be said about it here. It is sometimes said that a good measure of the skill of a nurse is her ability to get a patient to sleep. And it is very true that whereas with one nurse a patient may require large doses of sleeping draught, with another more skilled, less than half the doses may be sufficient for their purpose.

Insomnia is discussed in Part II, Chapter IV, and you will find there suggestions for treatment.

WORRY AND SLEEPLESSNESS

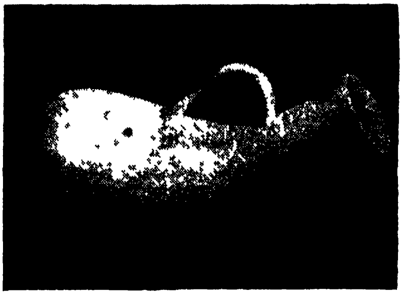
Some ill people get worried about the failure to sleep. An hypnotic, prescribed by the doctor, may be given for one or two nights, then the fact that the sleeplessness has been broken will often permit the patient to drop off on the third night. This is especially likely to happen if he is aware that the medicine is there should he need it.

Sometimes great comfort is found from a hot bath before sleeping, if it is allowed; if not, a warm wet pack may have the same soothing effect on a restless and possibly feverish patient.

The drugs used for aiding sleep will be described in a later chapter.

As soon as the fever has fallen you will find the patient asking to get up. Usually the doctor will keep him in bed for a day or two longer. The more prolonged the fever the slower is convalescence, and the longer the stay in bed for the patient, who may now only show the faintest rise of temperature at night, or none at all. Instead of having to aid a weak and exhausted patient in all his movements, the nurse is now confronted with the task of controlling one who inevitably shows impatience at his restraint. This requires tact and firmness—not to mention common sense. The authority of the nurse must be exercised.

A bed-pan.



A urinal.

CONVALESCENCE FROM FEVER

The stages of getting up after a long fever are: (1) rest on a couch, (2) sitting in a chair, (3) walking about the room, (4) going downstairs, (5) walking out of doors. These successive stages are arbitrary and may be merged into each other, particularly after a short illness. But they may have to be enforced rigidly after, for example, an attack of rheumatic fever, and discipline becomes all important. The duration of convalescence also, of course, varies with the illness, but after any severe fever it is not less than three weeks. During this time the patient is gradually building up wasted tissues, putting on the weight he has lost, and finally re-establishing that harmony between the various organs which we defined as the state of health.

CHAPTER IV

THE BLOOD AND ITS CIRCULATION

by K. D KEELE, M.D., M.R.C.P.

(See also Part II Chapter IV Diseases of the Heart)

IN this chapter we are going to talk about the heart, and its great work in pumping or circulating the blood through the body The process is rather complicated and you may feel that a knowledge of it is more than the ordinary busy person nursing an illness in the home needs Yet many of the ailments of life with which we come into too frequent contact are due to a more or less serious failure of this vital circulation system

THE MATERIALS OF THE BODY

Sometimes the human body is likened to a vast building of amazing delicacy and strength, the bricks of which are represented by microscopically small units called cells These cells vary in their characters, together in large masses they form different tissues For example, the cells forming the muscle tissue are quite different from those forming bone or skin In some ways the most surprising of all is blood—the only fluid tissue of the body Just as every brick in a building is set in place by mortar, so each cell is set in the body surrounded by intercellular substance, which in the case of blood is a clear liquid called plasma

Blood, then, consists of two main elements—the cells and the plasma, and its percolation to every part of the body through a system of intricate tubes is known as the circulation

As far as each cell is concerned, blood plays the same part as the visiting grocer, baker, milkman and dustman do in a smoothly run household—and more For not only does it bring to the cell its daily supply of nourishment, but it also brings air We also added the dustman to our list Just as the house would rapidly become clogged up with rubbish if it were not regularly removed, so would the cell with its own waste products

Yet even this is not all The blood also acts as a slow messenger between one organ and another One says "slow" because the great telegraphic messenger service of the body is the central nervous system Blood, however, is a much older method which still is used for various purposes Finally, there is the function of blood which we have already described, as heat regulator of the body Passing from organs and tissues like muscle, blood spreads the heat evenly over the body We have only to think of cold feet and how they get warm when the circulation is re-established, to realize the importance of this function

For the understanding and nursing of the sick patient we must examine these functions a little more closely. If you were to look down a microscope at a film of blood you would observe a

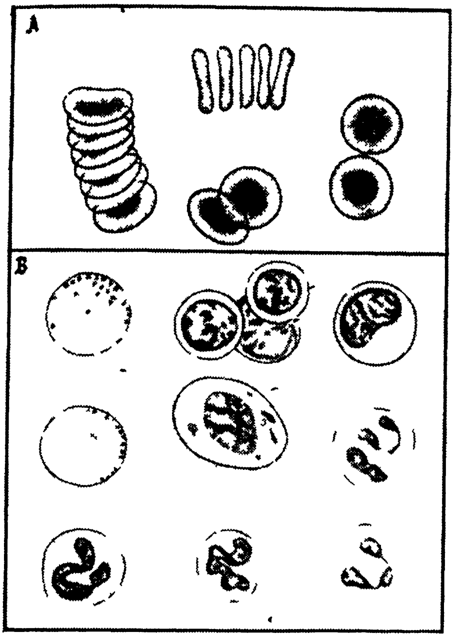


Fig. 1. *Red (A) and white (B) corpuscles seen under a microscope greatly enlarged*

picture like the illustration (Fig 1) The cells are picked out by being previously mixed with a special dye The fluid part (plasma) is thin and watery and does not show Two different kinds of cell are visible Some look just like little round biscuits, hollowed out in their centres They are red and show no structure. These are the red blood cells For every five hundred of these you would find one cell of a different nature These have a clear outline with a blotchy irregular mass in the centre called a nucleus They are colourless, and so called white blood cells or leucocytes (*leucos*. Greek for white, *cytos*—a cell) Several varieties of this kind of cell occur in the blood, and their variations are important to the doctor The blood is made up of equal parts, cells and plasma, in health If there is great shortage of the plasma for some reason, then it becomes thick If, on the other hand, there is shortage of the red cells, then the plasma becomes thinner and more watery than usual, shortage of red blood cells is what is called anæmia

For the doctor it is obviously important to know how many and what kinds of cells are present in the patient's blood To find this out he needs only a drop, which he gets by pricking the lobe of the ear or the tip of a finger This minute quantity of blood is sucked into a small mixing chamber mixed with a dye, and placed under a microscope so that the number of the blood cells can actually be counted and studied

The redness of the blood can also be measured It is due to a colouring matter or pigment which is locked away in each red blood cell It has a long name —hæmoglobin By treating a small drop of blood, the degree of redness

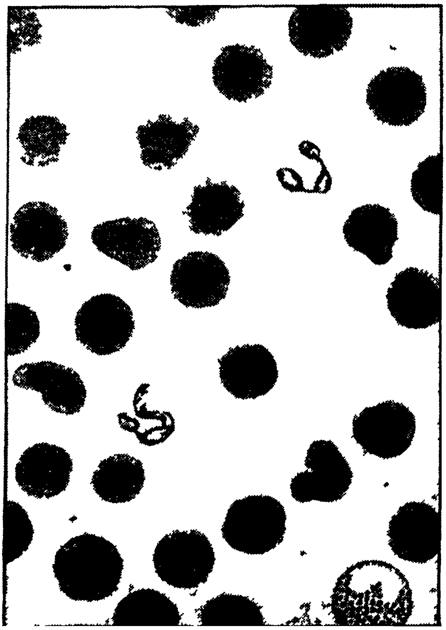


Fig. 2. *Blood as seen under the microscope greatly enlarged.*

is then compared with a fixed standard, so that any patient's hæmoglobin can be expressed as a percentage of normal —100 per cent is present in health.

Now, it so happens that the hæmoglobin is always in the red blood cell, and it is the pigment to which the vital oxygen of the air is linked. This gas is taken into the body by breathing. It reaches the lungs. There it comes into very close contact with a fine-meshed network of blood vessels containing myriads of red blood cells. These pick up their precious burden of oxygen by virtue of their hæmoglobin. Off they go on their journey to the tissues—shall we say, to the tip of your little finger. Here again the blood vessels come into a very fine microscopic network bathing the cells in the region. But these cells need oxygen to breathe, so it is unloaded and passed through the thin membrane of the little hair-like blood vessel to the needy cell. With the oxygen, the cell is enabled to keep the little fire of its activity burning—and so to do its work. Without the oxygen it would die in a few minutes. Now we begin to see how blood is so important a tissue.

WHAT "HÆMOLYSIS" MEANS

Each little disc of a red blood corpuscle has a fatty envelope round it. In fact, a red blood corpuscle can be looked upon as a little bagful of red pigment, the bag itself consisting of a fatty substance. Now, if the bag is burst the pigment (hæmoglobin) spills into the blood and mixes with the fluid plasma. This process occurs in disease and is known as hæmolysis. For example, the poison of a snake bite acts in this way. But the process is even more important in blood transfusion.

If the blood of one person is mixed with the serum of another, there is sometimes produced a clumping together of the red blood corpuscles, known as agglutination—the cells stick together. This process often precedes that of hæmolysis, or dissolving of the fatty bag, with the resultant loss of red hæmoglobin. Two such people with bloods that react in this way would be termed incompatible—that is, unsuitable for each other—from the point of view of blood transfusion. For the process of blood destruction in the sick person's body gives rise to fever, and worse symptoms, and may even cause death. Thus in transfusion of blood it is of vital importance to make sure that the red blood corpuscles of the donor (the person who gives the blood) are not agglutinated by the plasma of the recipient (the one who receives it).

THE FOUR BLOOD GROUPS

Now human beings, from this point of view, fall into four groups. In the first (I or AB) the plasma does not agglutinate anybody's red corpuscles. They are lucky people who can receive blood from anybody without harm. They are universal recipients. Group II or A people have a plasma that agglutinates corpuscles from Groups I and III or B. Group III or B people's plasma agglutinates corpuscles of Groups I or AB and II or A, and Group IV or O people's plasma agglutinates all other people's corpuscles, except those of their own group. Group IV or O people, however, possess corpuscles which are not agglutinated by any of the other groups. They are universal donors therefore. Over three-quarters of us belong to either Group II or A or Group IV or O.

This procedure will enable you to understand how important the process of grouping is in blood transfusion. In the autumn of 1939, when war broke out, large stocks of blood were taken and stored, labelled with their

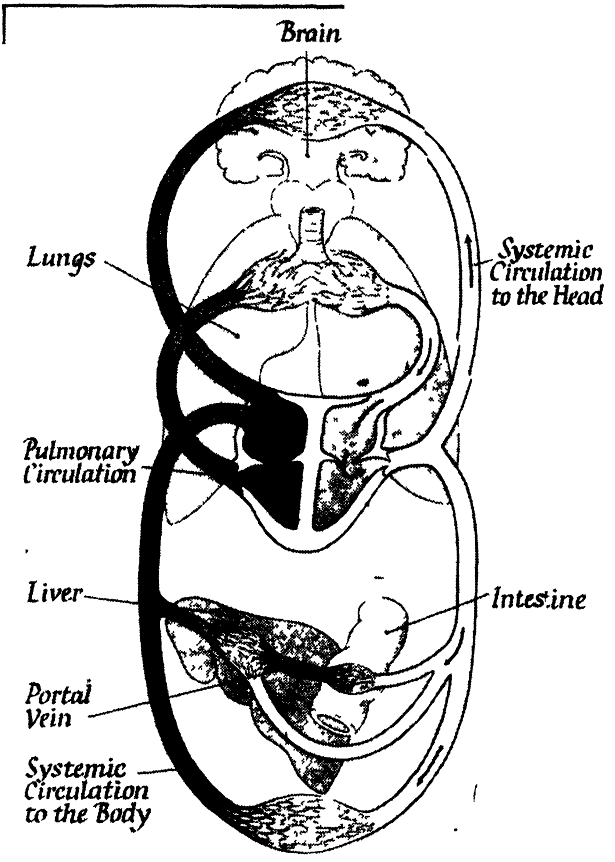

Brain
Lungs
Systemic Circulation to the Head
Pulmonary Circulation
Liver
Intestine
Portal Vein
Systemic Circulation to the Body

Fig. 3. *The circulation of the blood. Note how the arterial blood (unshaded) passes through the capillary network, becoming venous (shaded), returns to the right side of the heart, except in the pulmonary circulation.*

groups. The importance of this in such times needs no comment. In many cases, however, such as those of shock without much actual loss of blood, it is found that the fluid part of blood (plasma) separated from the red cells is very useful—in fact, sometimes more so—than whole blood. In this case there is no difficulty in obtaining plasma by grouping the right classes of blood. The use of plasma is going to be a great step in the progress of medical science.

We have already noted that the fluid part of blood is called plasma. This is a yellowish liquid. It is most complex, for it contains substances essential to blood clotting; food substances for cells which are being carried to their destination; waste products of cells which are being carried away to the kidneys; chemical messengers from one tissue to another, and many chemical compounds known as salts, among which sodium chloride or common salt is very prominent. In the plasma, too, will be found certain antibodies as they are called, which neutralize the poisons of disease. Antitoxins are an example of this type of substance, and are described more fully in the chapter on disease.

The clotting of blood is a most important process. We have all noticed how blood when shed soon sets into a sticky jelly, out of which a little yellow fluid may come. This process is complicated. At least seven different substances are essential to it. After a wound has been made, nursing is directed to encouraging the clotting.

We must now very briefly consider how this precious mobile tissue, blood,

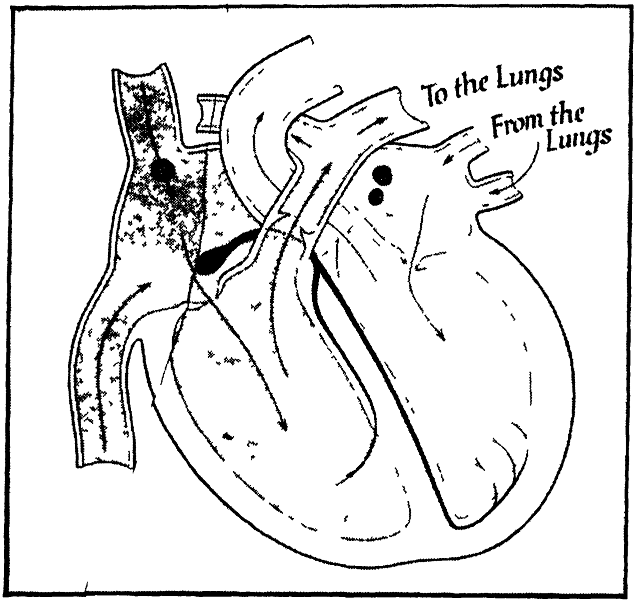


Fig. 4. *The four chambers of the heart. The arrows show the directions in which the blood is pumped.*

is distributed to the remotest corners of the body. This is achieved by the combination of a muscular pump, the heart, and a closed system of tubes, the blood vessels. Every tissue in the body depends upon receiving blood on account of the essential oxygen and foodstuffs which are carried in it. One of the quickest ways of killing a tissue is to stop its blood supply.

THE CIRCULATORY SYSTEM

There are in the body two almost separate circulations—one to the body as a whole, that is, limbs, head, intestines, etc.; and one with a special job—to the lungs. This is called the pulmonary circulation. The heart is the common pump for both these systems of circulation (*see* Fig. 3).

The heart is an organ which always appeals to the imagination, partly because its action is so essential to life, and partly because its movement is greater than that of any other organ in the body. It is a tough, hollow organ, just about the size of your closed fist. It is made up almost entirely of muscle. If the front of the chest wall is removed it is seen lying like a triangle across the middle of the chest with its apex pointing to the left. On each side it is overlapped by the lungs, more on the left than the right. It is surrounded by a thin bag of membrane called the pericardium (*peri* — around, *cardium*— heart). If we cut the heart open we should find that it is divided down the middle into two halves, by a wall. These halves do not communicate, but act as quite separate pumps (*see* Fig. 4). Each half is made up of two chambers, auricle and ventricle. The auricle is thin-walled and opens into the ventricle, which is thick-walled and is the actual blood pump.

To understand the circulation we must mention a few names which are not really difficult but require concentration. Let us follow a red blood corpuscle which is returning to the heart having given up its store of oxygen and taken up its load of burnt oxygen or carbon dioxide. From the main vein it enters the right auricle, where it collects and passes through the valve of three cusps (tricuspid) into the right ventricle. When this beats, or contracts, it passes out of this chamber into the pulmonary artery, which divides into two main branches, one to each lung. Gradually each artery divides into smaller and smaller branches in the lung just in the same way as a tree trunk divides until the smallest twigs are found. These smallest arterial twigs are called capillaries. Whilst our red blood corpuscle is in them it comes very close to the air breathed into the depths of the lung, and manages to give up its load of carbon dioxide gas, and gather a new burden of oxygen.

Now it starts the reverse process of descending the tree, so to speak. The blood vessels, now called veins since they run towards the heart, become larger and larger, until finally our red blood corpuscle finds itself in the left auricle of the heart. From here it is pushed through another valve, this time with two cusps arranged rather like the shape of a bishop's mitre (the mitral valve), into the left ventricle. This ventricle is much more muscular than the right: its wall is three times as thick. With its beat the red blood corpuscle is thrown out into the large main artery of the body called the aorta, which curls over in the chest like the head of a walking stick, veering to the left of the backbone. Passing down through the chest lying in this position it pierces the muscular midriff or diaphragm and runs down the centre of the back of the abdomen to a level below and to the left of the navel, where it divides into the two main arteries to the legs. The pattern and position of the aorta and some of its branches are illustrated in Fig. 6.

Taking one of these branches our red blood corpuscle eventually finds itself in another set of microscopic vessels or capillaries (Fig. 5) in, shall we say, the tip of the little finger. Here it unloads its oxygen and takes up a new load of carbon dioxide, again enters vessels of increasing size (veins), so travelling up the arm and across the chest until it enters a special large vein, the superior vena cava, which conveys it to the right auricle of the heart, from which our journey started.

But even now we have not finished with the vagaries of this circulation. You will notice in the illustration (Fig. 7) that special notice is taken of the arteries which supply the greater part of the stomach and intestines (bowels). These are, of course, concerned with taking nourishment into the body, just as the vessels in the pulmonary circuit are concerned with taking up the oxygen of the air. All the veins from the bowel join together then to form one large portal vein which runs into the liver and again divides up into capillaries there, as fine as anywhere in the body. Blood carrying food and nourishment is then brought into intimate contact with liver cells which act on the absorbed substances. Later the veins from the liver run into the inferior vena cava, the great main

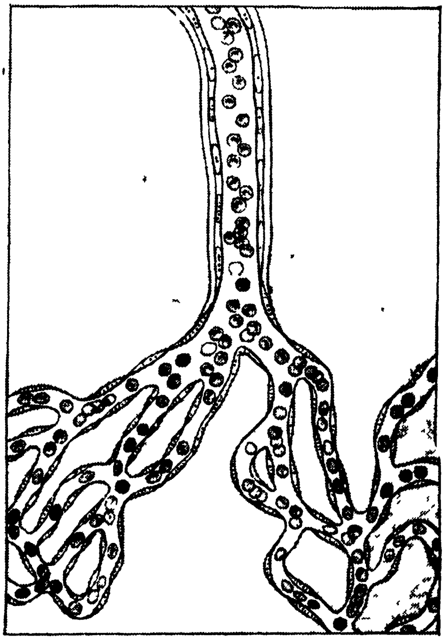


Fig. 5. *Red blood corpuscles as they are seen in the capillaries.*

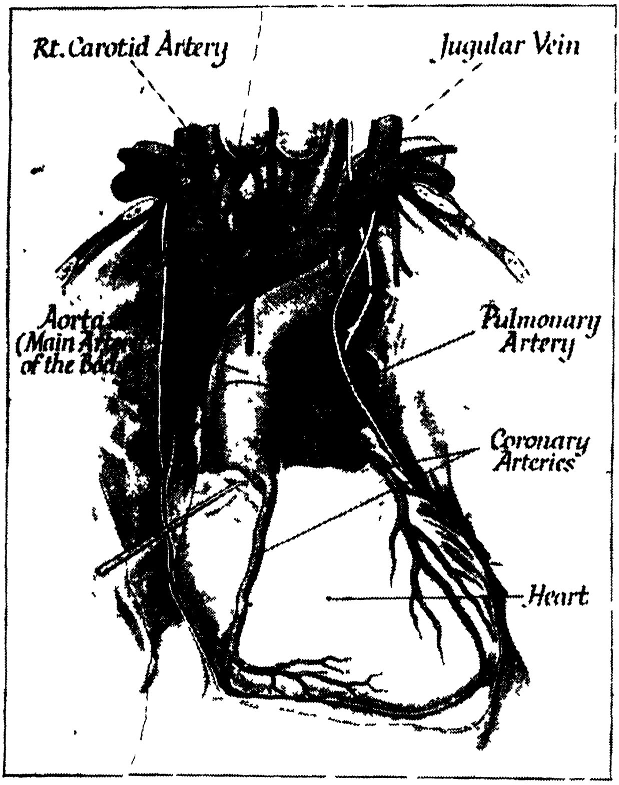


Fig. 6. *The heart and the great vessels.*

vein which collects blood from the lower half of the body, and so finds its way back to the right auricle, where it starts its journey again.

It is important for a nurse to have a clear idea of the difference between an artery and a vein. Fig. 8 shows this very clearly. The artery has a wall consisting of muscle much thicker than that of the vein which is a thin-walled passive tube. The artery, as we shall see, has to put up with a much higher pressure inside and at times contracts. Again the artery always contains blood coming from the heart to the tissues with a load of oxygen attached to its hæmoglobin (oxyhæmoglobin as it is called). Now this oxyhæmoglobin is bright red—so arterial blood is bright red. When the oxyhæmoglobin is reduced (deprived of its oxygen in the tissue) the blood becomes purple. This, seen through the skin, produces the blue appearance of veins. Blood in the veins is thus darker and more purple. A nurse can tell whether a vein or artery is bleeding by the colour of the blood in some cases.

We all know that the heart beats. Let us see how this happens.

Where does the heart beat originate? The heart muscle has retained its sense of rhythm, so to speak, more than any other tissue or organ in the body. And to this rhythm the whole body dances. Wherever you may peer in the dark recesses of the body, there will the pulsation of the heart's rhythm be seen in the blood vessels, even those microscopic in size. The seat of this dominant rhythm is in the right auricle just near the opening of the superior vena cava (*see* Fig. 9). From here the impulse which sets off the beat runs across the auricles like a spreading ripple on a pond. The ripple gathers together at the top of the septum or wall between the two ventricles, runs down a path which forks to left and right, and so into the walls of the muscular ventricles themselves. As it goes it sends off the trigger impulses that make the muscle of the heart contract. This it does in a wave so that the heart works as a whole as an efficient pump. If you imagine the heart at a moment when it is completely relaxed; first the auricles contract and push their contained blood through the auriculo-ventricular valves—(mitral or tricuspid) into the left and right ventricles. Then these contract powerfully and blood is forced out into the large aorta or pulmonary artery from left and right ventricles respectively. The blood is prevented from being pushed back into the auricles by the mitral and tricuspid valves which are flicked back into position. After the blood has entered the aorta or pulmonary artery the ventricles relax. Blood is prevented from filtering back into them by the aortic and pulmonary valves, which are situated right at the beginning of each great vessel. In this way the heart acts as two efficient pumps, taking the blood into each auricle and pumping it out on its journey from each ventricle, valves making sure that it is always pumped in the right direction. The heart beat takes under three - tenths of a second to perform. After each contraction (systole) there is a pause or rest called diastole, during which the heart muscle feeds itself and prepares for the impulse from above which sets off its next beat.

Now since the blood is pumped into the large aorta at each beat of the heart, it flows jerkily through the muscular tubes or arteries of the body to its distant goal. Actually the elastic tissue and muscle in the arteries smooths out this jerkiness very considerably. Nevertheless, if you place a finger over any large or moderate-sized artery of the body a jerk will be felt which corresponds to the outflow of blood at each heart beat. This is the pulse, the importance of which is now quite evident, since it reflects the condition of the heart which produces it.

We must note now what blood pressure is. Blood is forced out of the heart into the aorta and blood vessels

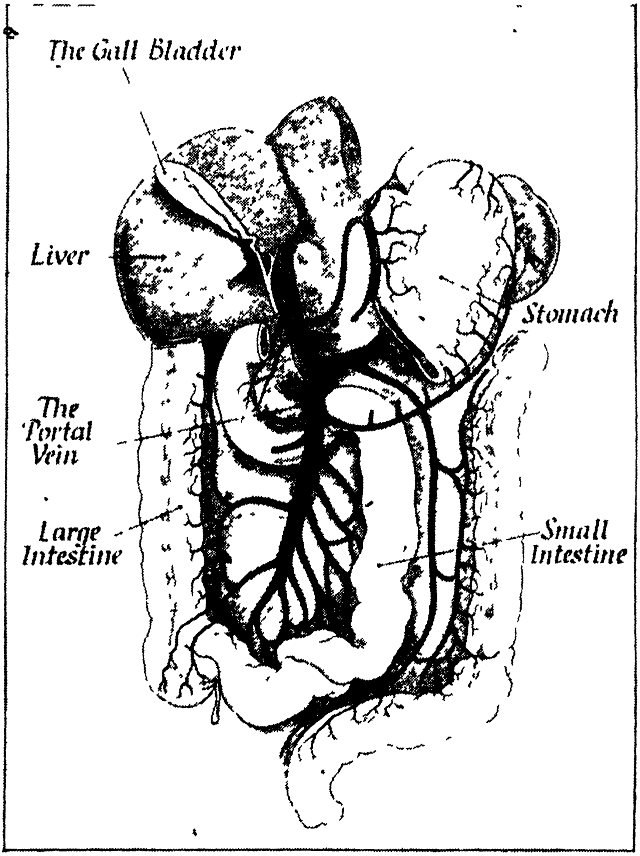


Fig. 7. *The portal vein, showing all the organs drained by it.*

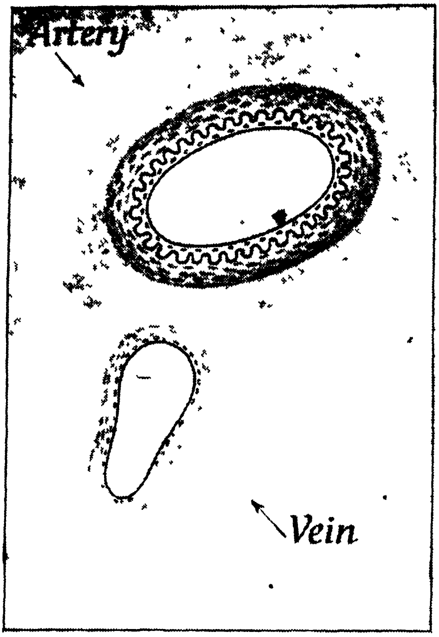


Fig. 8. *A cross-section of artery and vein.*

at each beat. This pumping force means that the blood is propelled on its journey under pressure. This pressure could be measured if it were travelling along a rubber tube by finding how tightly one must squeeze the tube in order to stop the flow. The higher the pressure inside the more tightly would one have to squeeze. In this respect the arteries of the body take the place of the rubber tube, and the blood pressure is measured by winding a hollow band round the arm (occasionally the leg is used).

Now air is pumped into this, so that the band blows up gradually like a tight balloon, its pressure being measured by a device such as a column of mercury. When the pressure in this armband stops the blood flowing, the pulsation of the artery on the opposite side of the band to the heart stops. This is the blood pressure. Another less simple figure is also measured by the doctor by listening with his stethoscope at the elbow to the beating artery. This figure gives him an idea of the tone and condition of the blood vessels.

Now, if the end of the rubber tube were partly stopped up and we went on pumping water into it, obviously the pressure inside would become higher than if the end were open freely. In the case of the body the rubber tube is represented by all the arteries. If the small muscular arteries at the ends become blocked, then the pressure as a whole will rise. This is what happens in raised blood pressure, and it is what most people mean by blood pressure.

SYMPTOMS OF HEART FAILURE

Now that we have briefly considered what happens in the healthy circulation we are in a position to understand the manifestations of failure or inefficiency of heart and blood vessels.

Shortness of Breath.—If the heart fails, for any reason, in its work as a pump, then blood becomes dammed back behind it. Often the first place where this occurs is in the pulmonary circulation through the lungs. If this happens, the congested lungs work uneasily and heavily to get more oxygen, the movements of breathing become exaggerated and laboured. In fact, shortness of breath develops, when the need for oxygen of the air is greatest—that is, on exertion, such as climbing hills or stairs.

Pain in the Chest.—Sometimes the heart complains, as other organs do, if the work it is asked to do is too much, and pain in the chest is noticed, again on taking exercise.

Œdema.—If the blood becomes dammed back into the veins, it collects in them, and after a time seeps through them into the tissues beneath the skin. This occurs particularly in the legs, these being the lowest parts of the body, so that the feet may swell unduly after standing, or at the end of the day. This swelling is known as œdema. If a finger is pressed firmly on such a part it will leave a small, hollow pit, which only slowly fills.

Cyanosis.—We have already noted that blood with plenty of oxygen is a brighter red than that which has been deprived of it. If the circulation is slow the oxygen is devoured eagerly by the cells of the tissues, the blood there becoming bluer than usual. Added to this, owing to the poor circulation in the lungs it may set out on its journey with a poor supply. These two factors combine to make the skin appear blue, an effect noticed earliest on the lobes of the ears, the lips and the finger-tips—this is generally described as cyanosis.

Before we pass on to the observation of the pulse it must be emphasized that any one of the signs and symptoms described above *may* occur from causes quite apart from any disease of the heart. These symptoms are described so that the home nurse may know how and what to observe.

Observation of the pulse is one of a nurse's most important duties. We have already seen how it is produced. From this it is logically evident that all arteries are traversed by a pulse wave. This is true, but only a few are accessible to the finger. The best arteries on which to feel the pulse are those that run across a hard bony surface against which they can be compressed. The radial artery which runs along the thumb side of the wrist is ideal. The temporal artery can be felt just in

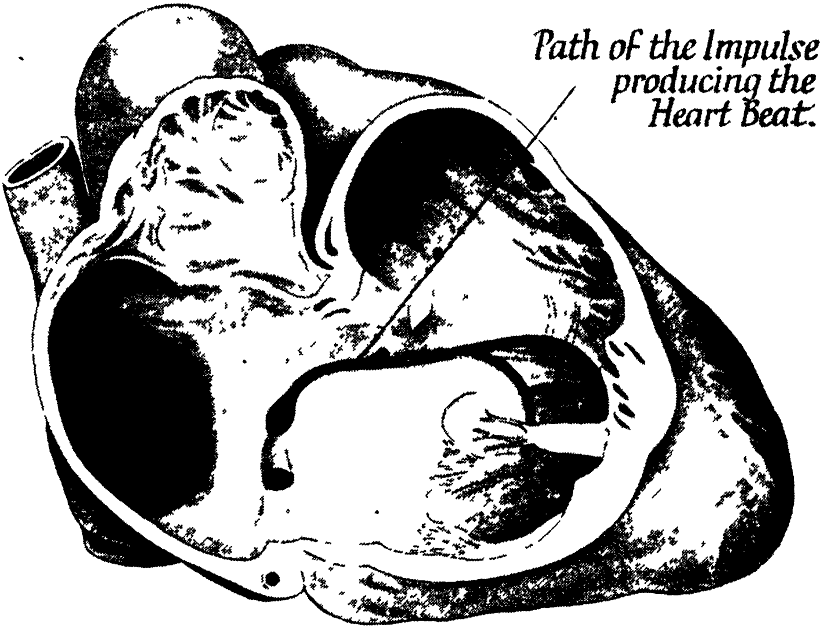


Fig. 9. *Diagram showing the path of the heart beat. The impulse starts at the dark spot near the opening of the superior vena cava, flows to the lower node, whence it passes by a special track which forks to each side of the heart as shown.*

front of the ear: the carotid in the neck, and the posterior tibial on the inner side of the back of the ankle. These spots are shown in the illustration. They are all useful and worth remembering.

To examine the pulse, the wrist of the patient should be taken so that the nurse's fingers comfortably grasp the radial, thumb side of the wrist (*see* page 22). (The pulse should never be felt by the thumb of the nurse, for that may contain sufficient pulsation in itself to deceive her.) Gentle pressure on this region will reveal the beat of the pulse. The first observation should be on the rate. This should be counted for at least half a minute, or, in cases of irregularity, for a full minute.

In health the pulse rate may vary from about fifty to eighty beats to the minute. This applies to adults. In infancy its rate is about 120 to the minute. As age increases the rate steadily becomes slower. At the age of six it is about 100 to the minute. The pulse rate is altered by posture and exertion. For example, it is more rapid in a patient standing than lying down.

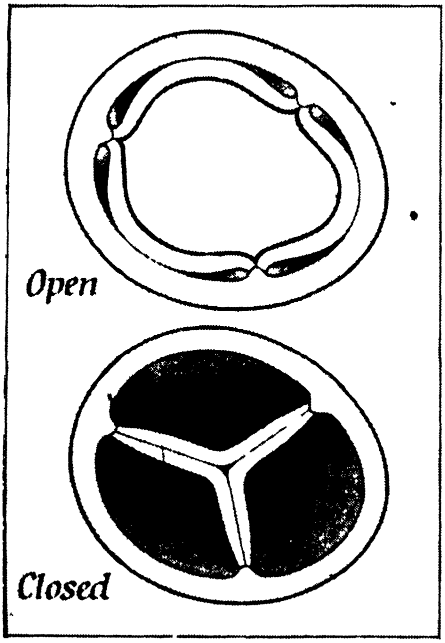


Fig. 10. *Diagram showing the valves of the aorta open and closed.*

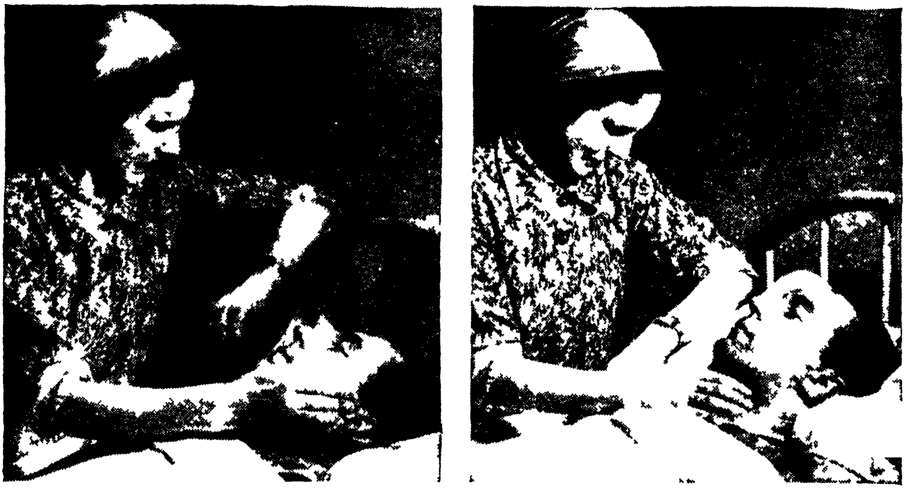
The pulse rate increases in any fever by about ten beats per minute for each degree rise in temperature. It increases also in patients who are shocked as a result of injury. It increases also in nervous excitement or anxiety and in nervous or mental states associated with these conditions. An abnormally slow pulse is much less common. It occurs in jaundice, in conditions where the pressure inside the skull is increased, and in some heart diseases.

THE RHYTHM OF THE PULSE

Next the rhythm is noticed. The healthy pulse is usually regular, but not always so. In children, for example, it is quite common to notice that the pulse rate increases as the child breathes in, and slows on breathing out. This, although sometimes causing alarm when first discovered, is perfectly normal and healthy. In the aged also, there appear quite commonly occasional jerky irregularities which also have no significance as regards health. Other irregularities of the pulse, however, are of importance. Any irregularity discovered by the nurse should therefore be reported to the doctor.

The amount of pulsation or volume is next observed. By comparing the feel of various people's pulses you will probably notice that it is bigger after exercise or in a warm person, and smaller after resting or in a cold one. This increase occurs in fever, or perhaps high blood pressure and in other states. Decrease often coincides with shock and collapse.

Next the pulse should be compressed until it is impossible to feel it. This



Taking the pulse in the temporal artery (left) and in the carotid artery (right). The temporal artery is found, not at the forehead, but in the little hollow in front of the ear.

gives the opportunity for feeling the artery itself. In health one cannot feel the obliterated artery, or at most can only just be felt.

Now do this exercise on yourself—feel your pulse. What is its rate? Is it regular? Of good volume? Is the artery palpable—these are the questions the doctor will ask.

It is not the arteries only which pulsate with each beat of the heart. Blood which is returning to the heart receives a jolt each time the beat occurs, and distends the containing vessel, which is this time a vein. In the normal person the veins of the neck are not filled with blood owing partly to the effect of gravity and the efficient way the heart deals with all the blood that is brought to it. If this efficiency is lacking then blood accumulates in the first convenient reservoirs. By referring to the diagram of the circulation it will be readily understood how the blood will collect in the veins, and in the liver. A column of blood collects, rising above the collar bone into the neck. This column pulsates with the beat of the

Taking the pulse in the tibial artery. We show these alternative methods of pulse taking because if the patient has injured arms, the pulse cannot be felt in the wrist.

heart—it is venous pulsation, and is evidence of an inefficient heart beat. It is important to remember two things, however, before making this observation. First that it is normal to see a wavy, diffuse venous pulsation at the root of the neck and even higher in a patient who is lying down, and secondly, that the carotid artery runs up the side of the neck, and can be seen pulsating—it can also be felt. With these facts in mind the nurse should observe for pulsation in the neck and report it, if present, to the doctor for final interpretation.

COUGH IN HEART CASES

Two other observations should be borne in mind by the nurse managing a heart case: they are cough and the condition of the urine. These are not described in detail here as they will be dealt with more fully in the chapters on the lungs and the kidneys respectively.

Cough is produced in heart disease quite commonly. Often it is a dry, unproductive effort, which exhausts the patient, and should therefore be noted, and treatment directed towards alleviating it. Often, however, the congested circulation in the lungs predisposes them to invasion by germs, and an attack of bronchitis may actually be the final straw on the camel's back, as far as the crippled heart is concerned; and as a result it fails to deal with the blood brought to it. If there is congestion of the blood vessels in the lungs, fluid may ooze through into the lung passages and be coughed up. There may also be actual bleeding into them, which results in the production of blood-stained phlegm. The appearance of this phlegm should be reported to the doctor.

SIMPLE OBSERVATIONS OF URINE

How to test urine is described in Part II, Chapter IV. In heart disease, with congestion, however, the most important observations are simple. First, the quantity passed in the day is noted (and this is compared with the amount of fluid taken in twenty-four hours). Next, the colour is examined and finally, if possible, the specific gravity. The quantity is often diminished in heart disease, since water taken passes into the tissues to form œdema or dropsy, instead of being excreted by the kidney. The colour may be high, because what urine is excreted is very concentrated, the pigment being an index of this concentration. Specific gravity is a term used to denote the density of urine as compared with water. It rises with the concentration of urine: and in heart disease it may rise to 1,040 and more. For further explanation of this subject refer to the chapter on the kidneys.

CHAPTER V

PREGNANCY AND DISEASES OF WOMEN

by E. R. REES, M.D., M.R.C.O.G.

(*See also Part II, Chapter V. Emergency Midwifery and Disorders of Women*)

WOMAN is, in many respects, as capable of bearing the burdens of the world on her shoulders as man. But because of the great responsibility nature has laid on her in making her the chief instrument of reproduction, woman has one disadvantage. No woman can go through life without suffering, however slightly, from the purely physical handicaps of her sex. Too many suffer more than slightly, and far too many suffer needlessly.

The group of diseases peculiar to women are disorders of the reproductive organs — more especially the womb. Women, not unnaturally, are inclined to fear these disorders, and this fear extends in many cases to the natural functions such as menstruation and pregnancy.

Now the object of this chapter, and Chapter III in Part II of this book, is not so much to tell you about the nursing of such women's diseases, because when serious cases do arise they are seldom nursed at home, but to help you to understand how the female body is constructed, how disorders may arise, and what form they take. A knowledge of these conditions as well as the nature and complications of pregnancy is both essential and interesting to the home nurse. This knowledge can only be achieved by first understanding the structure or anatomy of the reproductive organs and, secondly, by learning how each part carries out its duties; the latter study is called physiology.

Externally lies the vulva; two folds of skin lie on each side of a vertical cleft and these merge into each other in front to form a raised pad. The folds are known as the labia majora, and the raised pad is called the mons veneris. Both become covered with hair, at about the age of twelve to fourteen when the monthly periods commence (puberty). The folds gradually fade as they extend backwards and they unite behind the cleft.

When the labia majora are separated, two narrower folds are exposed; these are the labia minora. Separation of these reveals two openings: the one nearer the front known as the urethra is very small and it is through this that the urine flows out from the bladder. Behind this lies the entrance to the female passage or vagina. Guarding this entrance in the virgin lies a thin membrane called the hymen. The latter does not quite completely close the entrance to the vagina and its size varies in different people.

The internal organs consist of the womb or uterus, the two Fallopian tubes and the two ovaries. The vagina is the passage that extends upwards and backwards from its entrance into the vulva to the uterus around the mouth of which it is attached. It is about three and a half inches long.

The uterus (womb) is a hollow thick-walled, pear-shaped organ. It is three inches long, two inches broad and one and three-quarter inches from front to back. Its walls are about half an inch thick. The upper two-thirds is triangular in shape and is called the body; the lower third is narrow and is called the neck. The latter protrudes into the vagina and over the centre of this protrusion is a small opening which leads into the womb cavity.

Entering the body of the womb on either side are the Fallopian tubes. They are about four and a half inches long and their cavities are continuous with that of the womb. The walls of the tube are thin. At the other end the Fallopian tubes open into the general abdominal cavity.

Lying near the outer open mouths of the Fallopian tubes are the ovaries—one on each side. The ovaries are small oval bodies about one and a half inches long, three-quarters of an inch wide and half an inch thick.

REPRODUCTIVE ORGANS

If you look carefully at the accompanying diagram (Fig. 1) you should be able to understand quite easily the relation of these different structures. You should notice particularly and carefully the position of the bladder in front of the womb. The importance of this will be explained later.

The Ovary contains a large number of unripe egg cells. From about the age of fourteen until the cessation of the monthly periods (menopause) one of these eggs ripens regularly each month. It then bursts out of the ovary and passes onwards into the Fallopian tube.

The production of egg cells however is not the sole function of the ovaries. Most people are aware that the removal of an animal's sex glands not only deprives it of the power to reproduce its kind, but it also affects its growth and its general behaviour.

This influence of the sex glands is brought about by means of a chemical substance which they produce and which is passed into the blood stream. Such a substance is called a hormone.

IF OVARIES ARE REMOVED

It must not be concluded from this that the removal of the ovaries of an adult, which may be necessary for diseased conditions, seriously affects the body. On the contrary the disturbance is often very slight. The monthly periods however will cease, and naturally the capacity for reproduction is lost as the source of the eggs is gone.

It will be easier for you to understand the function or duties of the womb when you have read the paragraphs on menstruation and conception.

Puberty.—This is the term used to describe the changes that occur when the womb and ovaries first become active. It usually occurs at about the age of twelve to fourteen years.

Menstruation.—This is commonly known as the monthly period and consists in the discharge of blood and mucus from the womb. It usually takes place every month and the flow lasts from two to six days. Under the influence of the ovarian hormone the lining of the womb grows each month in preparation for the reception of a fertilized egg. If the egg is not fertilized, this lining is cast away. This separation of the lining causes tearing of the blood vessels; because of this, bleeding results. The menstrual flow, therefore, consists of portions of the lining of the womb, blood and mucus, the mucus being produced by the lining membrane. Now at this point you should note that the popular idea that harmful poisonous products are got rid of during menstruation is quite wrong. The lining which has been prepared for the reception of a fertilized egg is not required if the latter has not been fertilized and it is therefore cast away. This will happen each month as each new egg ripens until one of them is fertilized. The lining will then be required and will not be cast away. That is why the monthly periods cease during pregnancy.

Conception.—This results when the male cell which has been deposited in the upper end of the vagina travels upwards through the womb into the Fallopian tube and becomes united with the female egg. The fertilized egg, as it is now called, passes downwards into the womb, and there it burrows into the lining where it develops into the baby.

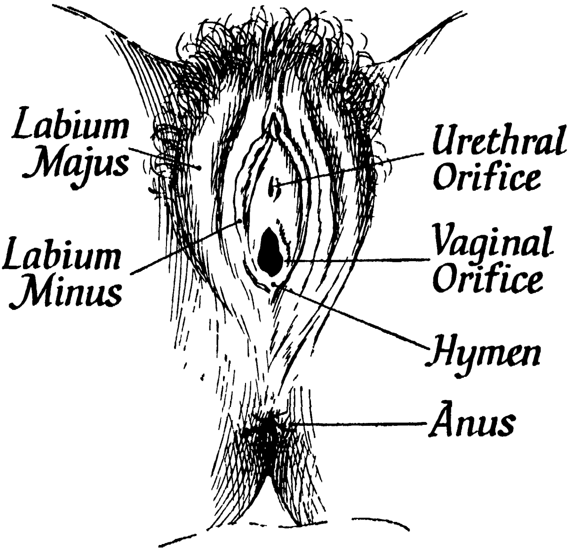


Fig. 1. *The external reproductive organs of a woman viewed from the front.* (*See page* 63 *for explanation of this diagram.*)

Menopause.—This is usually referred to as the change of life and it occurs most frequently between the ages of forty-seven and fifty years. The periods usually become irregular, both in the amount lost and in the interval between them. It must be stressed, however, that bleeding between the periods, or excessive bleeding during the periods, should never be attributed to the "change," and advice should always be sought if this occurs.

Pregnancy. — Some six hundred thousand women in this country bear children each year. This is a large and formidable figure and fully justifies the care and attention that is bestowed on the expectant mother. On the other hand, the enormous publicity devoted to the need for greater care during pregnancy has caused many women to view childbearing with a quite unnecessary and unjustifiable amount of alarm.

Nevertheless the intelligent woman should realize that reproduction is designed in the interests of the race and that it is occasionally accompanied by complications; and that these complications can be considerably diminished by proper ante-natal care.

As already explained, fertilization takes place in the Fallopian tube by the union of the male cell with the female egg. The fertilized egg or embryo, which measures one-quarter millimetre and consists of one cell, immediately begins to grow. At the same time it travels downwards into the womb. The one cell divides into two and each of these divides again so that four, eight, sixteen, thirty-two, etc., cells result.

HOW THE BABY DEVELOPS

On reaching the womb, the embryo burrows into the lining, inside which the remainder of its growth takes place. The embryo has now come to resemble a spherical ball of cells. It is from some of the cells inside this ball that the baby develops. The surface cells, on the other hand, are concerned with the supply of nutriment to the inner cells and with their protection. They develop finger-like processes which possess the power of invading the mother's blood vessels. In this way they obtain nutriment, and transmit it to the inner cells in much the same way that the roots of a plant burrow into the ground in order to obtain the nutriment necessary for its growth. This attachment of the finger-like processes becomes more localized after the third month. In this way is formed the afterbirth or placenta. The connexion between the afterbirth and the fœtus—that is, the child forming in the womb—becomes elongated to form the cord which is attached to the baby at the navel. When the baby is born, the separation of its attachment (afterbirth or placenta) exposes the open mouths of blood vessels in the mother's womb. The importance of this, and the danger of germs entering this open wound will be stressed later.

Apart from the presence of the developing embryo, many other changes take place in the body during pregnancy. In fact, it might be said that from the moment of conception, all the body processes of the mother adapt themselves to the need of the developing baby. For instance, the need for a soft relaxed womb that will not compress the growing baby is obvious. This change from a hard firm womb to a soft, yielding or flabby one, is brought about by means of an ovarian hormone. As the latter passes through the blood stream, it reaches all parts of the body and causes other muscles to become flabby. Flabbiness of the bowel wall causes constipation, and flabbiness of the muscle in the vessel walls causes varicose veins. They are usually seen in the legs, but they may occur in the back passage, when they are called piles or hæmorrhoids.

The same hormone from the ovary causes the ligaments joining the pelvic bones (the hip girdle) to soften and stretch a little in the later months. This increases the space available for the baby during its passage through the birth canal. On the other hand, this diminished rigidity of the joints makes them less efficient and firm in the transmission of weight. That is why the pregnant woman is less well adapted for vigorous exercise or heavy work in the later months.

THE MEANING OF "LABOUR"

After a period of approximately two hundred and eighty days, or nine months, the womb re-acquires the capacity to contract, and the woman is said to go into labour. The nature of this process by which the child is extruded from its mother will be described in Part II, Chapter V.

Understanding now something of the bodily changes of a woman in pregnancy, the home nurse will also

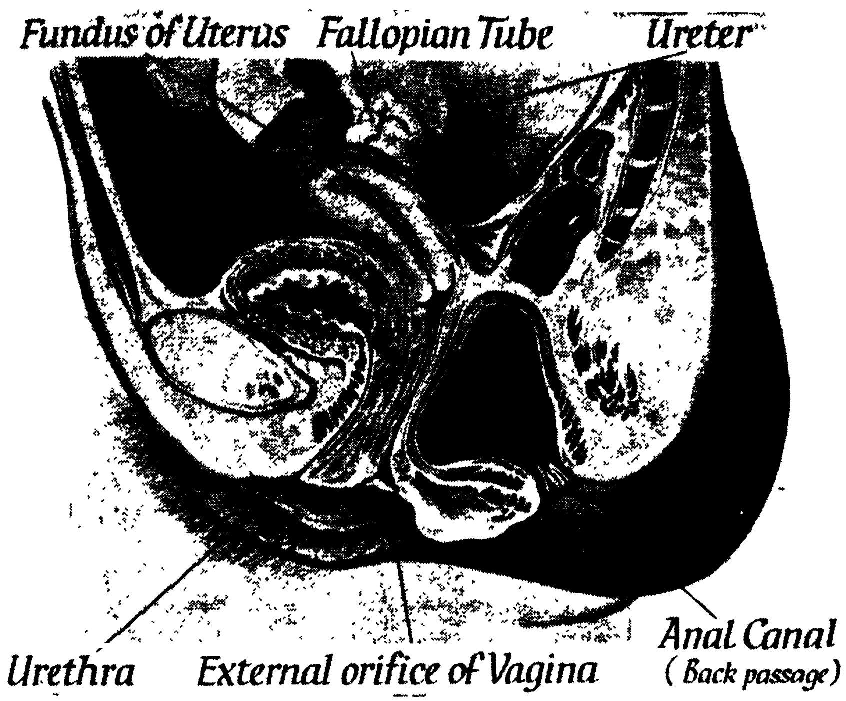


Fig. 2. *The reproductive organs of women. A longitudinal sectional view.*

understand the cause of some of the minor discomforts that the expectant mother undergoes.

1. **Morning Sickness.**—The real cause is not definitely known. It usually makes its appearance about two weeks after the first period is missed and lasts from four to six weeks. If it continues beyond this time, or if it occurs several times a day, there is probably a superimposed neurotic element—that is to say, it has a nervous, not a physical cause. In these cases firm management is usually successful; removal to hospital away from sympathetic relatives may be necessary. In the ordinary cases, however, a cup of tea and biscuit in the early morning is usually sufficient. The tea and biscuit should be taken *before* getting out of bed.

2. **Constipation.**—This is common in early pregnancy for the reason we have already discussed. It can usually be corrected by taking more fresh fruit and cereals; if necessary, a mild aperient may be taken. It is very important that the bowels are kept acting regularly during pregnancy.

3. **Varicose Veins.**—If there is a natural tendency to the development of varicose veins or if they are already present, pregnancy will readily cause them to get worse. They may cause the legs to feel very tired. Relief is obtained by resting the legs in the horizontal position whenever possible; bandages and elastic stockings may give much support. Injections are sometimes given nowadays, although some doctors prefer to wait until the pregnancy is over when a good many of the veins will disappear. Garters should naturally not be worn.

4. **Exercise.**—Violent exercise or very heavy work should, as has been said, be avoided. Light work, however, is beneficial, and the woman who does not do her own housework should take regular light exercise. A short rest for about an hour or so each afternoon is very helpful.

5. **Diet.**—Our advances in medical knowledge in the last few years have revealed an ever increasing number of diseases resulting from deficiencies in the diet. During pregnancy, therefore, when the growing embryo is constantly drawing on its mother's stores, any deficiency will be still more readily revealed. The safest way of avoiding deficiences in one's diet is to make it as wide and varied as possible. It is well known now that many women who have had several children, become anæmic; their diets have not contained sufficient iron to replace the amounts extracted from the mother by the babies. Foods containing the requisite amount of iron include liver, kidneys, red meat, green leafy vegetables and dried fruits.

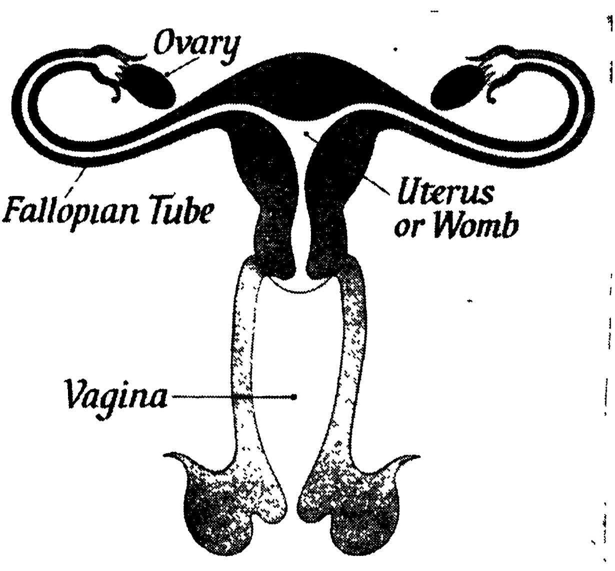


Fig. 3. *A diagram showing the womb and its position in connexion with the vagina and ovaries.*

The old phrase "for every child a tooth" was coined because of the appalling deterioration of teeth that so often occurs in pregnancy. The calcium (lime) requirements of the fœtus (unborn child) are great, and if the mother's diet is deficient in calcium, the fœtus then obtains it from the mother's bones and teeth. Numerous other examples might be quoted. Briefly it may be stated that the pregnant woman should take one and a half to two pints of milk per day. Red meat should be taken in moderate amounts and sea fish at least twice a week. Green vegetables and fresh fruit should be taken regularly. Eggs, butter and cheese are valuable contributions to the diet.

It might also be added that pregnant women are prone to become deficient in vitamins. The common sources are worth mentioning. Vitamins A and D are obtained from the fish oils. Vitamin C is contained in most fresh fruits, especially oranges, grapes and tomatoes. Vitamin B is contained in brown bread, carrots, beans, peas, eggs, lentils and green leafy vegetables. A wide and varied diet will contain most of the vitamins with the possible exception of vitamins A and D. Though they are present in butter, and to a less extent in some of the other foods, it is customary to prescribe cod liver oil or some similar preparation during pregnancy.

Clothing.—Common sense is the guiding principle. Corsets are seldom necessary during the first pregnancy. Repeated child bearing, however, causes much strain on the abdominal muscles, and if they are flabby some kind of support is necessary. Undue constriction should be avoided and the support should aim at slinging the enlarged womb from below, rather than subjecting it to compression from before backwards.

CARE OF THE BREASTS

As far as possible all clothing should hang from the shoulders. If the breasts are large and pendulous some support is necessary. If brassières are worn they should be so constructed that the nipples are not flattened and they should aim at lifting the breasts and not compressing them.

The nipples should stand out well; drawing them out gently between finger and thumb probably helps to achieve this. Finally, it might be added that many women with well developed nipples do quite well with no previous preparation.

Ante-natal Care is now such a universal practice that most women are aware of the need for expert supervision during pregnancy. The expectant mother should consult her doctor soon after she becomes pregnant; he will then advise her on the conduct of her pregnancy.

CHAPTER VI

MANAGEMENT OF INFANTS AND CHILDREN

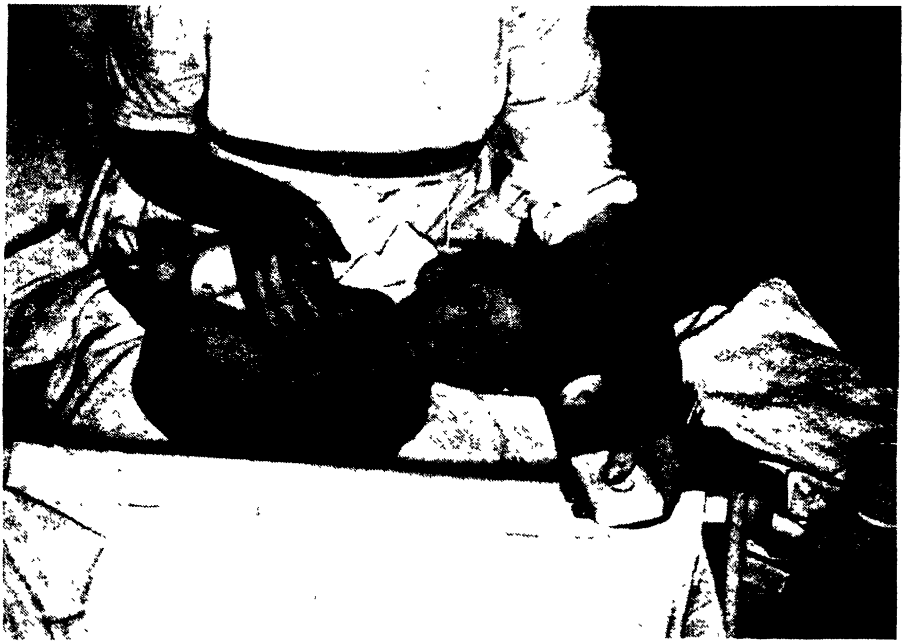
by G. H. NEWNS, M.D., M.R.C.P.

(*See also Part II. Chapter II. Common Ailments of Children*)

ALTHOUGH we no longer think of a baby's life beginning at the moment of birth—for it has been living already for many months—yet birth is the gateway to a very different kind of life from that which it has so far been living within the mother's body, and it has to make many adaptations and adjustments to the new kind of existence on which it has entered. Some of these, such as the establishment of breathing, are made within a few minutes of birth; others, however, come much more gradually and may take several weeks. The period during which these occur is one which demands special care, especially if the baby is a premature one (*see* page 78).

In the process of birth the head is compressed, and may be narrowed and lengthened. This moulding effect, as it is called, is quite natural and generally passes off in a few days. In cases where instruments have been used, a soft swelling may be present on one side of the head. This is due to a

Bathing a Baby (I). *Have everything you may require ready to hand. The child should be laid comfortably on the lap wrapped in a towel. The face should then be gently washed with a soft flannel. The nostrils and eyes are cleansed with cotton wool.*



Bathing a Baby (II). *Now uncover the child, but leave her lying on a towel, and with your own soapy hand, gently soap the baby's body all over as shown here.*

Bathing a Baby (III). *The child, if properly handled, thoroughly enjoys being bathed and this is the best part of the performance for her. Here she is going right into the water. The picture above shows just how the baby's body and head is supported.*

Bathing a Baby (IV). *With one hand supporting the head and back, soap is gently rinsed off the baby's body with a soft flannel. She is lifted out of the bath and dried.*

collection of blood under the skin of the scalp (*hæmatoma*), and, though unsightly, is not harmful to the child. It is in the nature of a large bruise which will pass off in a week or two.

When a baby is born its body is covered with a thick cheesy material, and the object of the first bath is to remove this. The navel must be carefully looked after to prevent it becoming septic—that is, poisoned. The stump of the cord gradually dries up about eight to ten days after birth. It should be dressed daily, and before attending to it the hands should be washed. The navel should then be dusted with a starch and boracic powder and wrapped in several thicknesses of sterile gauze, a binder being then applied. The best material for this is a crepe bandage, which has elasticity (flannel is inelastic and is apt to be too hot). After the cord has separated, the powder should be used for about a week, and then the binder can be left off.

THE DAILY BATH

The daily bath is an important event in baby's routine. This is best given before the six o'clock evening feed, and it should be arranged that a half-hour or so is left before the feed during which the baby may be picked up and nursed. For the bath you need: the bath tub, containing water at about 100 degrees Fahrenheit (the temperature should always be tested with a bath thermometer); a basin of warm water for washing the face; a sponge or washing cloth; soap; talcum powder; a soft bath towel; a soft brush; a fine comb; a large flannel apron.

To begin with, undress baby and place him in your lap. Then bathe his face with water from the basin, and wash the head and scalp with soap. Head and face are then dried thoroughly. The whole body is then washed with soap and water from the basin, care being taken to keep the infant covered as much as possible. After this, baby is placed in the bath and the soap rinsed off. After two or three minutes in the bath he is placed on warm towels and carefully dried. During the whole procedure it is important to prevent the baby's skin from becoming chilled. A small amount of talcum powder is dusted on the neck, under the arms and knees, in the groin and on the buttocks. The napkin is then put on and the child dressed.

The bath not only opens the pores and removes impurities from the skin, but it also exerts a soothing effect on the nerves and promotes rest and sleep.

The average weight of an infant at birth is 7 to 7½ lb., but it may be very much more, and weights of over 10 lb. are not uncommon. A weight of under 5½ lb. means the baby is premature.

The weight is an important index of progress, and should be taken once a week during the first year; during the second year once a month is sufficient. The child should be weighed on a special baby scale such as that shown in the illustration. If this cannot be done at home, the baby should be weighed weekly at the welfare centre.

WEIGHING THE CHILD

The procedure is as follows: undress the infant, wrap him in a blanket and place him on the scale, the weight being then taken. After taking baby away, the blanket is weighed separately. By subtracting its weight from the total you will obtain the weight of the baby. The special method of test weighing is described below in the section on the feeding of infants. Older children are weighed on an adult type of machine and should, if this is convenient, be undressed. A chart or notebook should be kept as a record.

Bathing a Baby (V). *When the baby has been dried, talcum powder is dusted on to the back, the neck, the buttocks, groins and armpits—in fact, where folds of skin may rub*

A healthy child gains steadily in weight The gain is 4 to 6 oz a week in the first six months, and 2 to 4 oz a week from six months to the end of the first year. A normal baby usually doubles its weight by the end of the fifth month, and trebles it by the end of the first year (*see* Fig 1)

The average height at birth is 19 to 20 in During the first year, the increase in height is about 6 to 7 in , thereafter the height increases by about 2½ in a year

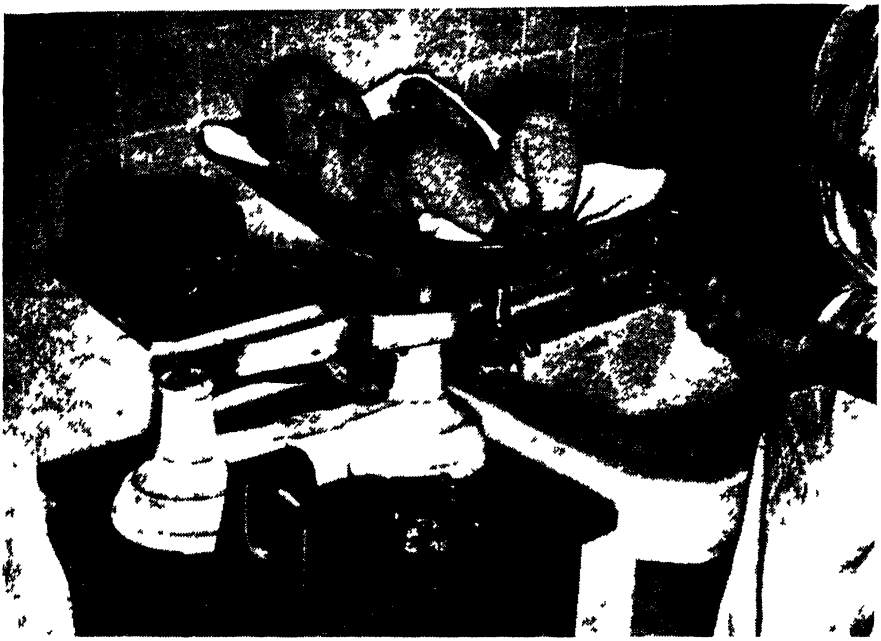
A child does not grow at the same rate throughout childhood In the first two years, between six and eight, and from thirteen to fifteen years, growth is much more rapid than at other times During the latter age-periods growth in height is greater than growth in girth, so that the child appears to get thinner. Later the child fills out.

The head of an infant is large in proportion to the rest of its body, and grows rapidly in the first year After this its rate of growth becomes very much slower

MILESTONES

Milestones is a name given to certain outstanding events in the development of the young child The first milestone is the appearance of the teeth The first of the milk teeth, or first dentition, appears at about six months, although there is sometimes a delay until the seventh or eighth month The names of the teeth and the usual order in which they break through are shown in Fig 2 The teeth of this first set number twenty in all. The complete dentition has usually appeared by the age of two and a half years.

Though teething is a natural process, certain minor troubles may be experienced during it. Many infants



A baby should be weighed once a week during the first year. The child should be laid on, or wrapped in a blanket, the weight of which must be deducted from the total weight.

become fretful, sleep badly, and lose their appetite. The gums may become swollen and red. Sometimes there is a slight temperature, and occasionally there may be convulsions. Relief may often be obtained by gentle massage of the gums with a soft piece of gauze which has been soaked in boric acid. If the symptoms are severe and persistent, sedatives may have to be prescribed by the doctor.

The permanent teeth begin to break through about the sixth year, the first to appear being the so-called sixth-year molar This erupts behind the second molar of the first dentition. The names of the teeth are shown in Fig. 2. By the twelfth to the fifteenth year, all but the third molars, or wisdom teeth, have appeared. These are very variable in their time of eruption, and sometimes they do not make their appearance until well into adult life.

At about four to six months baby begins to hold up his head, and a month or two later he will begin to sit up. Walking should start at about twelve months, and two or three months later a child is usually able to walk unsupported. Never attempt to force a baby to walk. He will start to do so naturally as soon as his muscles and bones are able to support him.

LEARNING TO TALK

Talking is a much more difficult art for baby to acquire, and is therefore rather later in development than walking. Early in the second year he will begin to say simple words, such as "mamma" and "dada." During the second half of the second year he is able to make short sentences. Sometimes talking is delayed beyond the usual period, and this often causes parents a good deal of anxiety. But if the baby is otherwise normal, there is no cause for alarm. Some infants develop speech much later than others, and may not start talking until well on into the second year. Once they do start, however, development usually proceeds at a rapid rate.

The doctor should always be consulted if there is undue delay in the development of walking or talking.

Another milestone during the first two years of a child's life is the closing of the fontanelle. The fontanelle is a large opening between the skull bones at the front of the head: it can easily be felt by the fingers. It is due to the fact that the skull bones are imperfectly developed at birth. Because of this they are able to overlap, thus making the head smaller and rendering the birth easier for the mother. This opening gradually becomes smaller, and finally closes completely about the eighteenth month.

The importance of the daily bath in the hygiene of the child has already been emphasized. In healthy babies it is not necessary to clean the mouth, as harm might thereby be caused to its delicate lining. The hair should be brushed daily with a soft brush, and the nails cut frequently. Baby's teeth may be cleaned by means of a small piece of cotton dipped in a weak solution of bicarbonate of soda and water. Later a soft brush may be used with a gentle movement. As soon as possible you should teach your child to brush his own teeth. This can often be done with success at a surprisingly early age in a child.

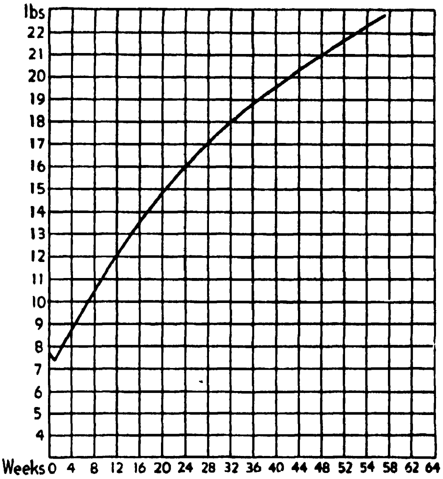


Fig. 1. *The healthy child trebles its birth weight in one year as shown here.*

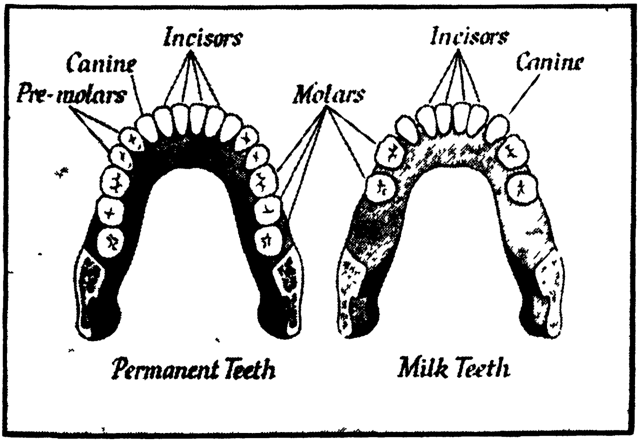


Fig. 2. *Diagrams showing the jaw of a child with first, or milk teeth, and the jaw showing permanent teeth.*

CLOTHING

Clothing should be warm, but light and well ventilated. Excessive wrappings are harmful, as they prevent air getting to the skin. Moreover, it is a well-recognized fact that children who have too many clothes on are more susceptible to chills than those who are more lightly clad.

Clothes should be made of a material that will absorb perspiration, and it is important that they should not restrict the movements. The daytime clothing of an infant should consist of the following items:—

(1) A long-sleeved vest, to which the napkin should be pinned at back and front. In winter this would be of silk or wool; in summer of cotton.

(2) A napkin of turkey towelling or butter muslin.

(3) A petticoat, long enough to cover the feet.

(4) Over this a dress of a material suitable to the season. Over this frock a knitted coatee may be worn.

(5) Knitted bootees, which should reach well up the legs.

The child's night attire should consist of a vest, crepe flannel nightdress, woollen jacket (in cold weather), socks and napkin. When the shortening period arrives, little change is necessary, except that all the clothes are made shorter. The night clothes remain the same for several years.

CARE OF THE NAPKINS

Napkins should be frequently changed. If they are left on for any length of time while wet the buttocks may become sore. Care should also be exercised in washing the napkins. First clean them by means of a hard brush, which when not in use should be kept standing in a jar of disinfectant and water. Then place them in a sink of cold water, after which they should be washed in hot water, being rubbed very thoroughly. Curd soap, which does not contain any soda, may be used. The napkins should then be placed in a copper and boiled for at least twenty minutes. They are then put through the wringer and dried.

After infancy, boys should wear a vest, shirt and drawers, and a suit of material suitable to the season. Girls should wear a vest, petticoat, knickers and a dress.

When the child begins to walk it is very important to select proper shoes, and care should be taken that they fit properly. They should be yielding, with the uppers extending just over the ankles. A shoe with a low heel should be worn, as the heelless type of shoe predisposes to flat feet.

TRAINING THE CHILD IN CONTROL

Training in control of the bowels and bladder is all-important. At about three months baby may be taught to use the commode. He should be placed on a small chamber resting on the lap. This training is especially important in the case of the bladder, and will result in early control of this organ. The baby should be placed on the pot immediately on awakening, and thereafter every three to four hours. As he grows older, he should be taught to go to the W.C. regularly every morning. Plenty of exercise and a diet containing an adequate quantity of roughage, such as brown bread, green vegetables, etc., are other important factors in maintaining a regular action of the bowels.

A young baby sleeps about three-quarters of the day, but as the infant grows older the amount of time spent in sleeping diminishes. Disturbance of sleep may be due to pain, such as colic or indigestion, too many or too few clothes, or to insufficient ventilation. Older children frequently do not get enough sleep. They should be put to bed at six to six-thirty. Even if they do not go to sleep for some time, the rest is beneficial. Every child should rest in the afternoon flat on the back for an hour to an hour and a half. This afternoon nap should be continued until the child is four years old.

Putting on a Napkin (I). *The child is laid on the lap as shown above. The towel should be folded into a triangle, and the long, straight edge slipped under the buttocks. The point of the top fold of the triangle is brought up between the child's legs.*

Putting on a Napkin (II). *The two ends of the straight edge are brought round the child's waist and the point of the lower fold of the triangle is then brought up through the legs, and all three corners are secured with a large safety-pin as shown here.*

A baby should get plenty of fresh air, and in mild weather may be left out in the pram in garden or porch most of the day. Even in cooler weather, providing it is sunny, he may be put out for an hour or two in the middle of the day.

The room used as a nursery should be well aired and should preferably face south. The temperature should be kept at about 70 degrees Fahrenheit. The best means of heating is a coal fire: gas stoves should never be used. Everything in the nursery should be washable. The walls are better painted rather than papered. The furniture should be of the kitchen type, of painted or plain unstained wood, which can very easily be washed.

GUARDING THE CHILD FROM INJURY

Care must be taken to prevent the child injuring himself. Never let down the cot sides unless someone is present in the room. Coins and similar articles, and painted toys, should be kept away from the child. When baby has reached the toddling stage, a fire-guard should always be placed around the fire whenever it is burning. It is a useful thing to have a play-pen in which the child can play with safety and with less supervision.

In nearly all parts of the country nowadays there are welfare centres where babies are seen by qualified doctors and advice is given on feeding, minor ailments, etc. There is also, in connexion with most of these clinics, a mothercraft meeting where the young mother may receive help and advice on various aspects of the care of infants. Every sensible mother will take advantage of these facilities, for her child's sake and her own.

Premature Infants need special care. For practical purposes, any infant weighing less than 5½ lb. at birth may be considered premature. A premature baby is, of course, tiny. There is very little fat under the skin, which is wrinkled and red in colour. Its body is covered with a soft fluffy down, called lanugo. Premature babies have very little power to resist infection, and should be nursed away from other children. Maintenance of the temperature of the body is very important. In very premature babies, it may be necessary to nurse the child in an incubator. In other cases an electric blanket may be used, or an electric lamp, protected by wire, can be placed inside the cot. Hot-water bottles will do provided they are changed frequently. These may be used in an ordinary basket cot, which should be lined with brown paper to exclude draughts.

At first, the baby should be handled as little as possible. The child should not be bathed, but the skin cleansed with olive oil. Very premature infants should have a thick layer of cotton wool next to the skin, and a pad of wool may be used as a napkin. Later, the baby may be clothed in a wool vest and a muslin napkin, with woollen socks reaching to the knees.

When the baby reaches the weight of 7 lb. its routine should be changed gradually to that of a normal baby.

The feeding of the premature baby is described in the section on infant feeding, below.

BREAST FEEDING

Breast milk is a baby's natural food, and there are very few infants whom it does not suit. However much one may modify cow's milk, it cannot be made as digestible as human milk. The latter has the great advantage of cheapness, and it is a much less troublesome method of feeding than the bottle. The infant thrives better on it, and, should he contract a disease, such as diarrhoea, he stands a better chance of recovery.

Mothers should make every effort to feed their babies at the very least for two or three months, and better still for six months or more.

Breast pump for artificial drawing off of milk.

Breast feeding entails certain sacrifices on the part of the mother. It takes up a good deal of her time, and tries her very considerably. It is, moreover, difficult, though by no means impossible, to manage a home and at the same time feed a baby successfully. Breast feeding is almost a whole-time job, and care and worry are very likely to react on the mother and cause the flow of milk to diminish. A tranquil mind is essential to successful breast feeding.

Some mothers without doubt are constitutionally unable to feed their babies satisfactorily. After a week or two the milk flow becomes very poor, and weaning is necessary. Very often, however, a poor supply of milk is due to bad management. Women who are tuberculous or who have kidney or heart disease are advised not to feed their babies. When breast abscesses or severe inflammation are present, temporary weaning will probably be necessary.

A well-balanced diet containing adequate amounts of meat, fats, eggs and butter, fresh fruits and vegetables and certain minerals such as calcium and iron (the doctor's advice should be sought in these matters) should be taken during pregnancy.

The preparation of the nipples during the last two or three months of pregnancy is important. They should be scrubbed daily with a soft brush and bathed in cold water. Methylated spirit should be applied to harden them. If they are much retracted or sunken, they should be gently pulled out two or three times a day.

DIET IN LACTATION

During lactation, or nursing, even more attention should be paid to the diet than during pregnancy. Plenty of fluid should be drunk, and half to one pint of milk a day should be taken. A malted milk stimulates the flow of milk, and two or three glasses a day of this may be taken.

Constipation should be guarded against. Plenty of green vegetables and fruit should be eaten. If drugs are necessary, liquid paraffin or senna are quite safe.

The watery fluid which flows from the breasts during the first few days after birth is known as colostrum. It has relatively little food value, and the new-born baby generally loses weight for a few days. No harm will result, providing that the baby gets a plentiful supply of fluid.

The baby should be allowed to sleep for some twelve hours immediately after birth. He may then be put to the breast every *six* hours. On the second day baby is fed every *four* hours, being kept at the breast for a few minutes. Milk generally comes in on the third or fourth day (sometimes as late as the fifth). If the infant is crying and restless and his weight falls more than ½ lb., it is advisable to give a small bottle feed, which may consist of a tablespoonful of boiled milk, two tablespoonfuls of boiled water and a little sugar. Only if absolutely necessary should this feed be given, as it may interfere with the proper establishment of suckling on the part of the baby.

After feeding, the nipples should be tended by being bathed with warm water and carefully dried.

REGULARITY IN FEEDING

Absolute regularity in feeding is essential. Three-hourly feeding is in most cases better at first, e.g., 6 a.m., 9 a.m., 12 noon, 3 p.m., 6 p.m., 10 p.m. If, however, four-hourly feeding is decided on, the times would be 6 a.m., 10 a.m., 2 p.m., 6 p.m., 10 p.m. Four-hourly feeding may be started when baby reaches 10 lb.

Only in exceptional cases is it necessary to give a night feed. Most babies will sleep during the period from the last evening feed (10 p.m.) until the early morning feed—which you may give a little earlier if the baby should wake. Alternatively, the last feed may be given at 11 p.m.

The baby should be put to each breast for ten minutes. This results in both breasts being fully emptied. After feeding, the baby must be held up to allow of wind being brought up; fifteen to twenty minutes is usually necessary for this. He is then put back in the cot to sleep.

At about the age of six months, or when the infant has reached the weight of 15 lb., mixed feeding may be started. This is really the beginning of the process of weaning. At 2 p.m. a feed of bone and vegetable broth is given before the breast feed. This may be administered with a spoon. A week or two later the broth may be thickened with a little cereal, such as groats. A little later still a feed of groats or cream of rice (a third of a cupful) may be given at the 10 p.m. feed, and soon after, a feed of Farex or ground rice at the 6 p.m. feed. When the teeth are beginning to come through, a rusk may be given once or twice a day at feed times.

By eight to nine months, baby will thus be having a mixed diet and will be almost completely weaned. After six months the juice of half an orange should be given in the morning and half a teaspoonful of cod liver oil twice a day. When weaning is complete the baby may be put on the diet recommended for bottle-fed babies of the same age (*see* page 85).

If weaning is necessary in the early months, it should be done gradually, first substituting a bottle feed for one of the daily breast feeds, then adding a second, and so on, the whole process lasting ten days to two weeks.

DIFFICULTY IN SUCKLING

If a child has nasal catarrh, or any severe deformity such as cleft palate or hare-lip, suckling will be very difficult, and special methods will have to be used. Weakly and premature infants also suckle badly and may have to be fed by a pipette. In these cases the doctor should be consulted. Sore nipples, or mastitis (inflammation of the breast), may interfere with breast feeding. If the nipples are sore, the use of a breast shield may get over the difficulty. Application of friar's balsam to the nipple is very beneficial. If severe, the unaffected breast may be used alone for a time and the milk drawn off from the other breast by means of a breast pump. Where there is definite inflammation of the breast, and perhaps abscesses, the difficulties are much greater, and the feeding may have to be temporarily suspended. In such cases the breast should be emptied with a breast pump, otherwise the flow of milk is likely to stop.

Where the breast flow is insufficient, certain measures may be taken to increase it, e.g., drinking more fluids and taking malted milk foods. Another method is to douche the breasts with hot and cold water alternately, followed by a brisk rubbing.

UNDERFEEDING

Underfeeding is much more common than overfeeding. Baby stops gaining weight, becomes constipated (he may pass small green stools—hunger stools) and is restless and whiny. He may suffer from vomiting, due to excessive air swallowing (windy milk). The true state of affairs is revealed by test feeds. These are made by weighing the baby immediately before a feed, and again immediately after the feed has been given. The difference in weight is equal to the amount of milk the baby has taken. You will see from the table (page 84) what weight of fluid food a baby should take in one day.

The treatment is to give complementary feeds, that is, extra feeds immediately after the breast feed. These feeds must not be made too sweet, or baby may prefer them to the breast milk. A good mixture is: equal parts of milk and water, with not more than one level teaspoonful of sugar to each 3 oz. (6 tablespoonfuls) of the mixture. Each breast feed should be given as a test feed, the deficiency being made up with the bottle feed.

Overfeeding places an undue strain on the digestion. For a time nothing untoward is noticed, except that there is an excessive gain in weight. But after a time diarrhoea starts, the stools often containing curds. Small vomits occur after feeds, colic frequently disturbs sleep, and the baby's weight becomes stationary.

Test feeds should be used to verify the diagnosis. Only one breast should be given at a feed, and the time taken over feeding may be reduced. The interval between feeds may be lengthened. By one or all of these measures, overfeeding can be corrected.

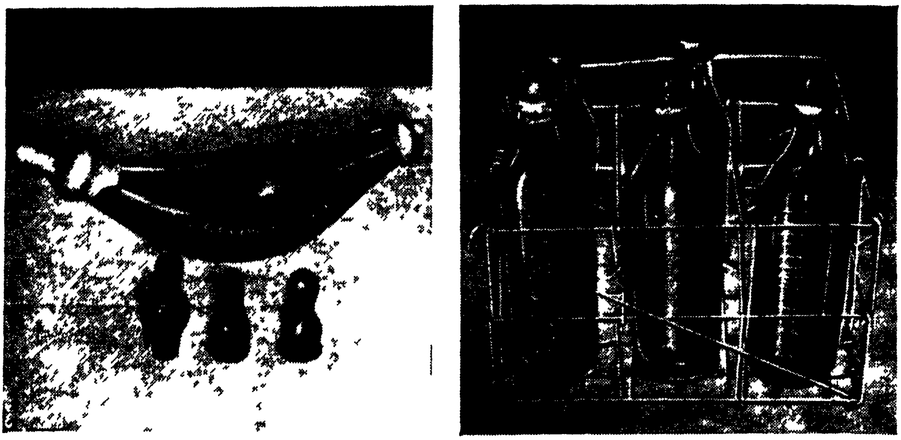
Should it be impossible for a mother to feed her baby herself, it will be necessary to feed it by the bottle, on cow's milk.

BOTTLE FEEDING

Cow's milk differs in certain radical respects from human milk, and, unless modified in some way, it is not a suitable food for human babies. It is much less digestible than breast milk, and forms curds in the baby's stomach much more easily. The fat is more likely to upset the infant. There is, moreover, insufficient sugar in cow's milk. By the time the milk reaches the consumer, the essential vitamins which prevent rickets and scurvy are frequently deficient.

Provided, however, that certain changes are made to correct the above differences, cow's milk is capable of making a fairly satisfactory and useful infant food.

It is advisable to use special milks for infants. Grade A milk is a milk specially prepared under clean conditions, and tuberculin tested Grade A milk is prepared from guaranteed tubercle-free herds. These are more expensive than ordinary milk. If you cannot afford them a good quality



(*Left*) *Boat-shaped feeding bottle and types of teats.* (*Right*) *Upright, or soxhlet type of bottle. You can prepare sufficient food for twenty-four hours and keep it in a refrigerator.*

pasteurized milk is satisfactory. Pasteurization does not harm the milk, but it kills off all harmful germs. If pasteurized milk is unobtainable the milk should be boiled (scalded) before use. Under no circumstances should milk which has not been boiled or pasteurized be given to children.

MODIFYING COW'S MILK

Generally speaking, whole or undiluted cow's milk should not be given to infants during the first three months of life, since, as pointed out above, it is too indigestible for most babies. The milk should be *diluted* with boiled water, barley water, or lime water, and *sugar* must be added. It is sufficient to use cane sugar, e.g., ordinary brown sugar; special milk sugar is not necessary. If there is a tendency to loose stools, dextro-maltose should be used. Fat in the form of cream may also be added, but it is better to supply fat in the form of cod liver oil; 1 teaspoonful three times a day, before a feed, given separately.

Unsweetened condensed milk is a satisfactory infant food, and is reconstituted by adding 3 oz. of water to 1 oz. of the dried milk. The amounts given are 2½ oz. of the mixture per lb. of body weight per day.

Sweetened condensed milk is *not* a suitable food for healthy infants, and should never be given for more than a few days. It is, however, useful as a temporary measure in feeding premature babies or babies recovering from indigestion or diarrhoea.

There are many starchy proprietary foods. While these are very useful as an addition to cow's milk, they should never be used as the *main* constituent in an infant diet.

CARE OF FEEDING BOTTLES

Bottles and teats must be kept scrupulously clean. When not in use they should be kept covered. The boat-shaped bottle (*see* above) is in most common use: this has the teat at one end and at the other a rubber valve which admits air when the baby sucks. It is easily cleaned, and because of the valve no vacuum forms in the bottle during feeding. The hole in the valve, however, is easily blocked. Moreover, the shape of the bottle makes it difficult to carry about. Another type of bottle is the upright or soxhlet bottle (*see* illustration). It is easily sterilized, and can be reheated by standing in a basin of water. It is more difficult to use, since a vacuum forms in the bottle while in use, and the teat must be frequently removed to allow air to get into the bottle, otherwise the milk will stop flowing. Soxhlet bottles have to be cleaned with a brush.

TYPES OF TEATS

There are many types of teats, some of which are shown in the photograph. A short teat is preferable, as there is less tendency for it to reach to the back of the mouth and make the infant vomit. The hole in the teat should be neither too large nor too small. Poor suckers should have a large hole. As a rule the hole should be of such a size as to allow drops to fall one just after the other when the bottle is inverted. The hole may be enlarged, if necessary by means of a red-hot needle.

The method of holding a baby for bottle feeding is shown in the illustration, page 154. After the feed is over, the infant should be held up for twenty minutes, as already pointed out, to allow the wind to be brought up (*see* illustration, page 155).

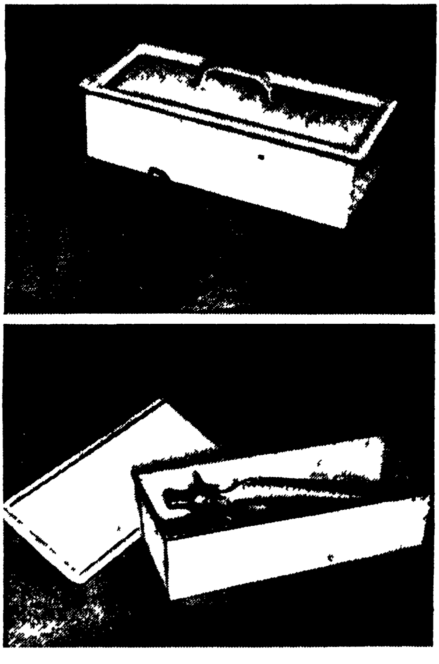
The following table (overleaf) gives the amounts of milk and sugar required by a healthy baby in the course of twenty-four hours.

The method is best explained by an example. If a baby weighs 8 lb. he will need during the whole day 24 tablespoonfuls of boiled cow's milk and 18 tablespoonfuls of boiled water, making 42 tablespoonfuls in all. In addition he will need 8 teaspoonfuls of sugar. As he is to have six feeds a day, each feed will consist of 7 tablespoonfuls of milk mixture. It is more convenient and easier to make up the day's supply all at once, but each feed can, of course, be made up separately.

These amounts are not intended to be rigid; you can vary them more or less according to the gain in weight of the infant. As mentioned above, 1 teaspoonful of cod liver oil should be given three times a day before feeds, and first thing in the morning the juice of half an orange diluted with a little water should be given.

If the baby is a weakly one, it may be desirable to give a weaker milk mixture, e.g., half milk and half water, adding the same amount of sugar. Thus an 8-lb. baby would get during the day:—

Milk, 20 tablespoonfuls (10 oz.),
Water, 20 tablespoonfuls (10 oz.),
Sugar, 8 teaspoonfuls,
Six feeds of 6½ tablespoonfuls (3¼ oz.), and so on.



This is a very useful container in which to heat the baby's bottle. Notice the stand for the bottle. The container can be put directly on to the stove.

Weight of infant in pounds.	*Ounces of cow's milk.*	*Ounces of water.*	*Level teaspoonfuls of sugar.*	*Number of feeds in 24 hours.*	*Amount of each feed in ounces.*
6	9	6	6	6	2½
7	11	7	7	6	3
8	12	9	8	6	3½
9	14	10	9	6	4
10	15	10	10	5	5
11	16½	11	11	5	5½
12	18	12	12	5	6
13	20	12½	13	5	6½
14	21	12½	14	5	6½
15	22½	12½	15	5	7

Table I. *N.B.—1 oz. of milk equals 2 tablespoonfuls.*

After a month, you can continue with the stronger mixture, as above.

An alternative to feeding with a cow's milk mixture is to give one of the proprietary dried milks. These are milks made by drying cow's milk and adding sugar. One group of dried milks are known as humanized milks, as they are modified in such a way as to resemble human milk. Half-cream milks have a reduced fat content as compared with whole-cream milks.

HALF-CREAM MILKS

It is advisable in the first three or four months to use half-cream milks or a humanized food. These milks are reconstituted, that is, converted into a milk mixture, by adding one measure (given in the tin) of the dried milk to 8 teaspoonfuls (1 oz.) of water. This equals 1 oz. of cow's milk.

The following table (page 85) shows the average amounts of half-cream and humanized milk that should be given. Sugar has already been added in most of the dried milks, but may have to be added to half-cream milks. Whether this is necessary or not will be stated on the tin.

As in breast feeding, the baby should be fed three-hourly until he weighs about 10 lb., and thereafter four-hourly. A night feed is seldom, if ever, necessary and should not be encouraged.

Cow's milk feeds are best prepared for the whole day at once and may be kept in a closed jug in a cool place. When a feed is due, the requisite amount, after mixing, is placed in the bottle, which is warmed to about 100 degrees Fahrenheit in a basin or pan of water.

When dried milk is used, it is more convenient to prepare each feed separately. The milk is measured out and mixed into a paste with a little cold water. When thoroughly mixed the required amount of hot water is added, stirring all the time. This method avoids the formation of clots.

When the infant has reached the age of six months or 15 lb. in weight it needs more concentrated nourishment than can be obtained from milk. It is at this time that mixed feeding should be started. Cereals in one form or another may be added to the diet, but gradually and in small quantities at first. At the 10 a.m. and 6 p.m. feeds cornflour, barley flour, or groats should be added to the feed. At 2 p.m. some bone and vegetable broth should be given. One of the proprietary starch foods may be given in place of the starchy foods mentioned above. Care should be taken not to overdo the starch, since this may result in baby becoming too flabby and overweight. A little purêed vegetable, for example, spinach, may be given at about the eighth to ninth month, and at about this time a little egg yolk may be introduced (*see* page 86, Diet Sheet 1).

Feeding the Premature Infant is difficult, as he often cannot suck properly. If he cannot, a specially small bottle with a small teat may be used, and the milk drawn off by pressing it out, or by a breast pump. The infant should be fed at first two-hourly by day and three-hourly by night. If the baby is over 4 lb. he may be fed three-hourly by day and four-hourly by night. As soon as the child is strong enough to take the breast, he should be nursed. If it is necessary to give the baby an artificial feed, one of the unsweetened condensed milks may be used. This may be given in a weak dilution at first, if the baby is very small. For a 4-lb. baby 1½ oz. of the milk mixture should be given at each feed, the amount being gradually increased. When the weight is 5½ lb. ordinary feeds may be given.

WEANING

No definite time can be given at which to discontinue the 10 p.m. bottle feed. Some children can do without it as early as the sixth month. It should nearly always be possible to dispense with it by the ninth month. The amount of the feed should be cut down until it is omitted altogether.

As the infant approaches the age of one year, it is usually possible to reduce the feeds to three main meals a day. The early morning feed is dropped, and some orange juice and water substituted for it. The midday feed is given at 1 p.m., and the 6 p.m. feed moved back to 5 p.m. At first it may be necessary to give some milk and water at 10 p.m.

After the age of one year the diet is widened little by little, by gradually adding minced meat, steamed fish, bacon, etc. At two to two and a half years, when all the teeth are through, the same type of feed as for adults may be given. Diet Sheets 1 to 5 give diets for various age periods in childhood.

Weight of infant in pounds.	*Heaped teaspoonfuls or measures of dried milks.*	*Ounces of water.*	*Number of feeds in 24 hours.*	*Amount of each feed in ounces.*
6	15	15	6	2½
7	18	18	6	3
8	21	21	6	3½
9	24	24	6	4
10	25	25	5	5
11	27½	27½	5	5½
12	30	30	5	6
13	32½	32½	5	6½
14	35	35	5	7
15	35	35	5	7

Table II. *N.B.—One measure of dried milk plus 1 oz. (2 tablespoonfuls) of water equal 1 oz. of milk.*

Meals should be given regularly, and no food should be given in between meals. Ample amounts of fresh fruit and vegetables should be included. Too much starchy food, such as bread, potatoes, porridge, milk pudding, etc., should be avoided, and adequate quantities of protein, e.g., meat, fish and eggs, which contain the body-building part of the diet, should be given. Milk, though a valuable article of diet, should not be given to excess; one pint a day is sufficient from eighteen months onward.

FOOD RECIPES

Acid Milks.—Milk, 20 oz. Bring the milk to the boil, cool, skim off the cream, add 40 minims of lactic or dilute hydrochloric acid drop by drop, stirring vigorously after each addition. Add water and sugar suitable to the age of the child.

Albumen Water.—Take the white of a fresh raw egg; cut it in various directions with a pair of clean scissors. Shake it up with ½ pt. of cold water. Add salt or a little white sugar to taste, and strain through muslin.

Barley Water.—To 3 pts. of boiling water in a saucepan add ½ oz. of pearl barley in powder made into a thin paste with 2 oz. of cold water. Boil, and stir for one minute.

Bone and Vegetable Soup.—Take 1 lb. of veal or beef bones well broken up, cover with water, add 1 teaspoonful of vinegar, and simmer for seven hours. Add one potato, one carrot, with cauliflower and green vegetables, simmer for one hour more, strain, cool.

Peptonized Milk.—Dilute ½ pt. of milk with ¼ pt. of boiling water. Add to this pancreatin 3 grains, sodium bicarbonate 8 grains, and keep it at a temperature of 112 degrees Fahrenheit for fifteen to twenty minutes. Finally bring just to the boil and cool rapidly.

DIET SHEETS FOR CHILDREN

1. For Children from Six to Nine Months:—

Meals to be given at 6 a.m., 10 a.m., 2 p.m., 6 p.m., 10 p.m.

At each meal give: Boiled milk, 10 tablespoonfuls (5 oz.); water, 4 tablespoonfuls (2 oz.); sugar, 1 heaped teaspoonful.

At 10 a.m. and 6 p.m. give in addition: 1 heaped teaspoonful of a cereal food of the whole wheat flour variety, groats, rice flour, etc.

At 2 p.m. give in addition to milk: 2 tablespoonfuls of bone and vegetable soup (*see* Recipe above).

To prevent scurvy, 2 to 3 teaspoonfuls of orange or tomato juice, diluted with water and sweetened with sugar, should be given daily.

To prevent rickets, half a teaspoonful of cod liver oil, or one drop of halibut liver oil, should be given immediately before three of the feeds every day.

N.B.—In order to give the thick feeds it will be necessary to make a large hole in the teat. An alternative is to spoon-feed from a cup.

2. For Children from Nine to Twelve Months:—

On waking. 1 tablespoonful of orange or tomato juice, diluted with water and sweetened with sugar, 1 rusk.

8 a.m. Milk, 8 oz., thickened with groats or wheat flour, fed with a spoon from a cup, or the same quantity of milk given with a rusk or a dry biscuit.

Four mornings give, if possible, half of a lightly boiled egg yolk, and three mornings in the week, a rusk or toast fried in bacon fat.

12.30 p.m. 4 tablespoonfuls of bone and vegetable broth, 1 tablespoonful of mashed potato and 1 tablespoonful of sieved vegetable such as spinach or carrots.

Milk pudding, such as ground rice, tapioca or sago, cooked with 4 oz. of milk and a teaspoonful of sugar.

4.30 to 5 p.m. Boiled milk, 8 oz., with a biscuit or a rusk, alternating with baked egg custard or stewed fruit.

10 p.m. Milk, 8 oz., if awake. Cod liver oil should be given as in Table 1.

3. For Children from One to Two Years:—

On waking. The juice of half an orange with water and sugar, or a dessertspoonful of tomato juice.

8 a.m. Milk, 4 oz. (8 tablespoonfuls), to which has been added one or other of the cereals.

Toasted bread fried in bacon fat, or a small rasher of crisp bacon, or a soft boiled egg (four days a week).

An extra 4 oz. of milk should be given as a beverage.

12.30 p.m. Any of the following: fish, chicken, brains, tripe, sweetbreads, liver, scraped or underdone steak.

A vegetable, e.g., mashed potatoes, carrots, cauliflower, greens, spinach, etc.

Milk pudding with stewed fruit.

4.30 p.m. Milk, 8 oz., with thin bread and butter and honey or golden syrup.

A piece of sponge cake. Some seedless raisins.

6.15 p.m. It should not be necessary to give anything after tea. If, however, the child has eaten a poor tea, what remains may be offered at bedtime.

The cereals may be selected from the following: porridge, fine oatmeal, groats or packet cereals.

Cod liver oil or halibut liver oil should be given three times a day.

4. For Children from Two to Seven Years:—

On waking. The juice of half an orange or of a whole tomato.

8 a.m. Porridge, or any packet cereal, to which add 4 oz. of milk.

An egg (if possible, three a week).

Crisp bacon (three mornings a week).

Fish or liver (one morning).

Crisp toast with butter.

4 oz. of milk as a beverage.

12.30 p.m. Cutlet, beef, fish, tripe, chicken, liver, rabbit, underdone steak, finely cut up—1 or 2 tablespoonfuls.

One heaped tablespoonful of boiled, mashed or baked potato.

One heaped tablespoonful of mashed carrots, peas or beans, lentils, greens, sprouts, cabbage, etc.

Milk pudding and stewed fruit.

Water to drink.

4.30 to 5 p.m. Milk, 6 oz.

Thin bread and butter, with honey or golden syrup.

Mashed over-ripe banana, or stewed fruit. A piece of sponge cake.

6.30 p.m. Unless the child has made a poor tea, nothing should be given before going to bed.

Cod liver oil or halibut liver oil should be given three times a day.

5. For Children from Seven to Twelve Years:—

Breakfast. Start with an orange, banana, ripe apple, or half a grapefruit. This may be followed with a small helping of cereal.

An egg three mornings a week. On the other mornings, crisp bacon, fish, sausages, ham or liver.

Toast, butter and marmalade.

Milk or weak tea and milk, to drink.

Dinner. Beef, mutton, veal, chicken, mince or stew, fish, liver, etc. One or other should be given.

Boiled, baked or mashed potato

with carrots, parsnips, or green vegetables such as spinach, sprouts or cabbage.

Stewed fruit, milk pudding or egg custard, or boiled pudding with golden syrup or jam.

Water to drink.

Tea. Thin bread and butter, with fruit such as baked apple or stewed prunes or bananas.

Sponge cakes or seedless raisins.

Milk or weak tea and milk, 7 oz.

N.B.—As the child grows older it may be necessary to give a more substantial supper, a kind of high tea. Suggestions are:—

Ham with salad, fish and potato, sausages and potato, kidneys on toast, macaroni cheese, sardines on toast, etc. In addition, a sweet should be given.

Round about the age of ten years a light tea may be given at 4 to 4.30 and supper at 6 to 6.30.

CHAPTER VII

DRUGS AND POISONS

by K. D. KEELE, M.D., M.R.C.P.

THERE is an atmosphere of distrust which clings round the word "drug" and not about the more commonly used word "medicine." It is worth while, therefore, to try and clear up this confusion at the outset. Since the word drug may be defined as a substance which has a medicinal action on the body, it will be seen at once that the prejudice against using it is unfounded. This prejudice has arisen from the use of the common phrase a "drug addict"—which term leads us to the next important rule: that all drugs which are useful to the body when skilfully administered may be poisonous and dangerous when improperly taken. It is very important that a home nurse should understand this fact. The bottle of medicine used properly under the instructions of the doctor may be an instrument of great value in treating the patient. If, however, for some reason she decides to give a double dose or more, she is playing with the serious risk of turning beneficial medicine into harmful poison.

A drug, then, is a substance, not a food, which has an influence on living tissues which may be beneficial. Substances which have a consistently harmful action on tissues are poisons. This definition must not obscure the fact that there is no clear line between the two. Take a well-known example—alcohol. In some ways alcohol may be looked on as a food. Doctors often prescribe it as a drug. As a poison its action is very evident in a man who is "dead drunk."

Now in this chapter we shall very briefly discuss drugs and poisons separately, since the way in which it will be necessary for the home nurse to act will be very different in the two cases.

Drugs are given for their beneficial

action in disease. Let us quickly glance at their manner of action.

Drugs usually act on the small microscopic units, cells, and so on a tissue as a whole. A drug may either increase or decrease the activity of a cell (it cannot change the nature of this activity). The former is called stimulation, the latter depression. For example, if the tissue is muscle, the cells may be stimulated to contract or be made relaxed and passive. Some drugs produce irritation which is harmful stimulation—the poisonous effect is beginning to show.

Most drugs tend to act on certain organs of the body—some on the heart, others on the nervous system, etc. Anæsthetic drugs, for example, have a peculiar affinity for the cells of the brain, which they put out of action, so producing unconsciousness. A few relatively simple drugs have been found which act on the germs invading the body, and not on the body tissues themselves to any great extent. This is of the greatest importance in overcoming infections and fevers. One group of chemical compounds containing sulphur, known as the sulphonamide group, is now used to control such scourges as pneumonia and spotted fever.

EFFECTS OF MEDICINE

Whenever a nurse is giving medicine she must always be aware of facts which may alter its action in any way. For example, size and weight of the patient are of importance; for the larger a person, the more will the drug or poison be spread out and the less will it be concentrated at any one spot—in the case of a poisonous dose an advantage, but not so in the case of medicine. Large people, then, need larger doses than small.

Children need much smaller doses of medicine than adults largely for this reason, but also because their tissues are growing, and are more sensitive to drug action.

Now any drug given by mouth has to pass through three main stages: (1) Absorption by the stomach and intestines, (2) its passage via the blood, through the liver into the general blood stream, and so to the organ on which it will act and some of it be destroyed, (3) to the organs of excretion, either the kidneys or the bowels, by which route the body rids itself of any excess of the substance.

HOW ACTION IS ALTERED

The action of any drug may be very considerably altered if, for example, absorption is delayed, or excretion of it interfered with. Action of drugs and poisons is delayed if taken after meals, because absorption is delayed in the intestine. Conversely, a drug taken on an empty stomach acts quickly. Vomiting and diarrhoea remove drugs rapidly, sometimes preventing any absorption at all. In kidney disease drugs may fail to be excreted from the blood and may accumulate there, producing a poisoning effect. A nurse always has to keep alive the possibility of drug action being disturbed by such errors of the body as these. Sometimes patients are very sensitive to common drugs, even in the smallest doses. This is known as idiosyncrasy. Just as some people cannot tolerate milk or eggs, others have sickness, diarrhoea and rashes with certain drugs. Such abnormality is fairly well known with some drugs, such as iodides, but may occur with any other. The nurse must watch for such symptoms, and be ready to report them to the doctor, so that he can decide what action is necessary.

The opposite to idiosyncrasy is known as tolerance to a drug—or rather, this might be considered as one form of idiosyncrasy. In this case the tissues fail to react at all to the action of the drug. Tolerance varies in different animals very markedly. For example, rabbits can hardly ever be poisoned with deadly nightshade, however much they take, whereas this is very poisonous to man. But tolerance is sometimes acquired by taking a drug over a long time. Take, for example, nicotine. The reactions of the small boy to his first cigarette are well known. Tolerance, however, is rapidly acquired, and he soon smokes pipe and cigar with impunity.

METHODS OF ADMINISTRATION

Besides all the above conditions which a nurse and doctor keep in mind as influencing the results of taking a medicine, there is also the important question of the route by which it is given. Drugs may be given for their local or general action on the body. For example, drugs are sometimes applied in the form of ointments and plasters put on the skin to relieve symptoms locally. Gargles and lozenges, douches and enemas are all methods frequently employed as means of local administration: occasionally ointments are used for general action after absorption

RATE OF ABSORPTION

Drugs which act remotely or generally on the body after they are absorbed, are usually given by the mouth, dissolved in water, or alcohol, or in the form of pills and capsules. From the mouth drugs quickly find their way to the stomach and intestines. Different drugs are absorbed at different rates, and we have already noted some of the conditions which bear on the rate of absorption. Drugs dissolved in water are more rapidly absorbed than those which are usually taken in solid form.

Another route of administration is via the lungs. Volatile, gaseous drugs can be given this way. Anæsthetics such as ether and chloroform are well-known examples. Oxygen is given via this route. Amyl nitrite is also inhaled and has dramatic effect in relieving pain in heart disease.

It is only in comparatively recent times that it was found possible to give a drug by piercing the skin with a hollow needle and injecting it beneath. This is known as hypodermic injection. From under the skin absorption is more rapid than from the bowel; and, in cases where there is vomiting and gastric upset, hypodermic injection ensures that the full dose of medicine gets into the patient's body. Hypodermic injection may have to be given by the nurse, and we shall discuss its technique later.

INJECTIONS AND SUPPOSITORIES

In other cases the needle is put into the muscle beneath the skin. From here the drug is absorbed even faster. For this reason the dose used is often smaller. Hypodermic and intra-muscular injections have the possible disadvantage of causing pain, and also of introducing infection if strict cleanliness is not observed.

Injections are sometimes made into veins. This is the most rapid way of introducing a drug into the blood stream and so to the tissues.

Drugs are occasionally given in the form of a suppository which is put into the back passage or rectum, whence it is absorbed into the blood. Enemas of coffee are also given in cases of shock. It will be seen from the above that the doctor's problem is not only what drug is suitable, and what dose, but also by what route to administer it, in order to achieve the best result.

Three familiar types of bottle. (Left) The little bottle used for drops or small dosage (Middle) The ridged poison bottle. (Right) the graduated medicine bottle.

All these questions entail consideration before a judgment is made.

MEASURING MEDICINE

Very often medicine is an important part of the doctor's treatment, and it is a part which always devolves on the nurse. Once again we must emphasize the importance of accuracy in following the doctor's instructions on the matter. The responsibility is largely one of measuring accurately. Medicine is most commonly preserved in bottles of familiar shape. Sometimes these are marked so as to enable one to see how much is left. Such marks are not as accurate as on a medicine glass, which should always be used. A good glass is clearly marked in tablespoons and teaspoons. Household teaspoons vary greatly in size and so are not a very reliable measure unless checked up beforehand against the medicine glass. Usually a bottle of medicine will be clearly labelled as to how much medicine should be taken and when. But should the doctor leave written instructions they may contain certain symbols which a home nurse would find strange. We give a table therefore, containing the quantities used in medicines, their symbols as used by the doctor, and their approximate equivalents in domestic measures.

Liquid Measure	*Quantity*	*Symbol*	*Domestic Measure*
	1 minim	♏i	1 drop
60 minims =	1 fluid drachm	ʒi	1 teaspoonful
	2 drachms	ʒij	1 dessertspoonful
	4 drachms	ʒiv	1 tablespoonful
8 fluid drachms =	1 fluid ounce	℥$^{1}_{iv}$	2 tablespoonfuls
5 fluid ounces =	1 gill	=	1 teacupful
20 fluid ounces =	1 pint	=	2 tumblerfuls

The practice of using Roman numbers and symbols is declining and some doctors use other abbreviations such as drm. for drachm and fl. oz. for fluid ounce, and ordinary numerals. It will be a long time before this comes into general use. To make matters more difficult there is the fact that the continent of Europe uses the metric system (litres and cubic centimetres). Conversion of one system of measures into another is confusing and the home nurse should not try it if she comes across this difficulty. Rather should she insist on the dose which she is asked to give being prescribed in measures she knows.

POURING THE DOSE

The common doses of medicine are in teaspoons (drachms) or tablespoonfuls (two to the ounce). Medicine glasses are made which are graduated clearly in minims. These can be bought if necessary, but usually they are used by the dispenser in making up the medicine. Spoons with graduated marking equivalent to one tea and tablespoonful are also made, and may be preferred to medicine glasses.

To pour out a dose of medicine, the cork should be taken out and held by the curled little finger of the right hand, the remaining fingers picking up the bottle. The clean medicine glass and bottle are then held up to the level of the eye in a clear light, and the medicine poured into the glass which must be held straight. As the fluid rises in the glass a curve will be seen at its upper level. This is the meniscus, and its lower edge should coincide with the marking of the dose on the medicine glass.

ACCURACY IN TIME

Accuracy both as regards dose and time is important. Often the doctor uses the symbol t.d.s., which means three times a day (from the Latin *ter die sumendum*). This may be followed by the letters p.c. (*post cibum*) after food, or a.c. (*ante cibum*) before food. There are a host of other similar abbreviations which need not burden the brain of a home nurse. Should she come across mystic letters of this type amongst her directions she should straightway obtain clear explanation of them from the doctor.

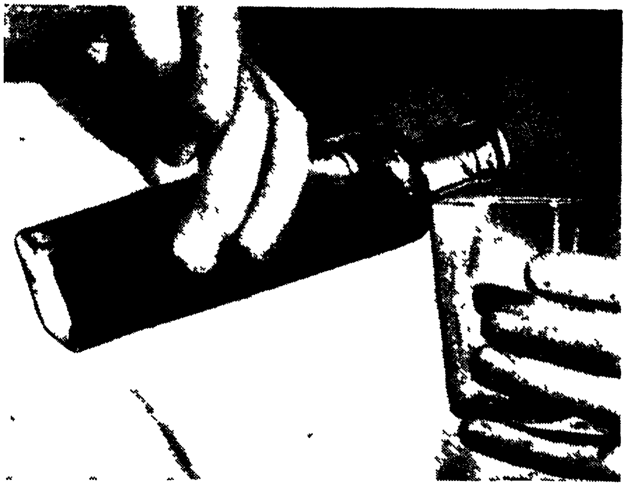
Medicine ordered before food (a.c.) should be taken a quarter of an hour before; that ordered after food, a quarter of an hour after the end of the meal. T.d.s.—or three times a day—means a dose in morning, afternoon and evening—after breakfast, midday meal and tea are the best times, as they are usually the most convenient.

The administration of medicine should become one of the most strictly kept items on the invalid's routine of the day. Do not give medicines at odd hours; but always at the same time. This will help you to get your patient to take the dose without undue fuss or bother, whereas if you hesitate, or say

The graduated medicine glass.

you'll leave it for half an hour, you are asking for trouble.

With children, and even with some adults who ought to know better, medicine taking will come first amongst the nurse's little trials of skill and good temper. The occasion should never be one for fuss and bother. It should be treated as an incident, casually yet firmly. The bribe of a sweet to follow, particularly barley sugar, outmanœuvres most children. Never use force or lose your temper; either is disastrous.



The correct method of pouring out medicine. Notice the cork held in the little finger, the tilt of the bottle and the label uppermost to prevent its getting stained.

Quite often medicines are given for sleeping. These should usually be given after the patient has been settled down. They take about half an hour to take effect. Try and understand what the medicine you are giving is for, and then you will be able to avoid the silly mistake that *has* been made of waking the patient to give him his sleeping draught! Sometimes, however, as for example, in rheumatic fever, it is important that the doses should be spread out evenly through the twenty-four hours. In such cases the doctor will make it clear that the patient must be wakened. It is a question of assessing which is more important to the patient, sleep or medicine—and it has got to be a very useful medicine that outweighs Nature's remedy of sleep for the sick person.

There are one or two points about the medicine bottle which should always be borne in mind. A sticky bottle is an abomination. It can be avoided by carefully scraping off the last drop on the rim of the medicine glass and by keeping the bottle always well corked. In fact, no medicine bottle should ever be left about without a cork. A dirty medicine bottle, not necessarily sticky, is not only unpleasant to look upon; it may be a danger if the label is smeared.

Labels on medicine bottles can be kept clean by keeping them uppermost when pouring out a dose. And remember, they are there to be read on each occasion as a routine, whether you think there is any chance of making a mistake or not. It is useful, of course, to keep the bottle always in the same place. Often part of the directions on the label will be to "shake the bottle." This is particularly important in medicines that have a sediment at the bottom; it is a useful habit in all cases. If such a medicine with a sediment is not shaken, then the top doses are deficient in strength while those at the bottom of the bottle are too strong. Some very powerful drugs tend to sink with the sediment, and many cases of

Shake the bottle! Notice the finger kept on the cork—in case it pops out.

poisoning due to not shaking the bottle do occur. To shake the bottle, place the first finger on the cork and invert the bottle with a turn of the wrist to and fro several times. There is no need for violent movement at the elbow. Oily medicines, if objectionable, such as castor oil, may be given "sandwiched" between two layers of a pleasant fruit juice which will disguise the taste to some degree.

PILLS AND POWDERS

Solid medicines taken by mouth are usually in the form of pills, capsules or powders. These forms are nowadays becoming increasingly popular because they are so convenient. A pill is always coated with some relatively tasteless material, or with sugar. If the pill is crushed in the mouth, the objectionable taste of the drugs inside will become only too apparent. The art of taking a pill is to get it on to the back of the tongue first, then take a mouthful of water, throw the head back and swallow. The pill will then vanish easily and not get stuck halfway. Some people cannot achieve this trick however hard they try, and for them pills should be avoided or crushed to a powder and washed down with water, or in the old-fashioned way, concealed in a teaspoonful of thick jam.

CAPSULES

Capsules are similar to pills, except that the outer covering is of gelatine, which is dissolved by the digestive juices before the drug inside is set free to be absorbed. They should be taken in the same way as pills, but they cannot be crushed as a rule. Powders are taken by the spoonful, placed on the tongue and washed down with water. Tablets may be taken in the same way as pills, or be crushed first and taken like a powder. Some of the new medicines of the sulphonamide group, such as sulphanilamide and sulphapyridine, produce considerable nausea and sometimes sickness. These drugs are most important, and it is sometimes vital that they should be taken. It is sometimes helpful to crush the tablet first. Crushing it and mixing it with an alkaline draught, such as sodium bicarbonate solution (1 teaspoonful to half a tumbler of water) is a very useful method. Finally, it can be made up in a bottle of medicine with alkali and suspended in a thickening mucilage.

Inhalation is another route for giving medicine. The commonest inhalation is for local treatment of bronchitis or infection behind the nose. The bronchitis kettle and the use of inhalers and oxygen are described in the chapter on the lungs. An important drug given by this route is amyl nitrite. This is provided in a glass ampoule suitably protected. The ampoule should be broken and placed in a large clean handkerchief which has been folded into a cone, the patient's face being placed in the open mouth of the base of the cone so that he shall inhale as much as possible. This drug is used in cases of painful heart disease.

Hypodermic injection of drugs should be part of a good home nurse's accomplishment. As we have already mentioned, many drugs are given by this route, perhaps the most important being morphia. Insulin in the treatment of diabetes is another important example. Actually by far the majority of diabetic patients soon learn to give their injection themselves.

In making a hypodermic injection the first thing to do is to rid the syringe and needle from all germs—a process known as sterilization. This is best done by taking the syringe to pieces and putting these in a saucepan of cold water. This is brought to the boil slowly, kept so for fifteen to twenty minutes, and then cooled. The parts of the syringe are then taken out with clean, washed hands and arranged.

CARE OF THE SYRINGE

An alternative and perhaps easier method of keeping a syringe sterile is to lay it in methylated spirit when not in use—or at least for twenty minutes before using. Special syringe holders designed to hold spirit are made and a syringe can be carried about in one's pocket sterile all the time. In this case the syringe must be washed out with boiled (sterile) water before using. An injection made with spirit in the needle is often quite painful.

With sterile hands and sterile syringe, the next step is to choose the site of injection and sterilize the skin. The best places are perhaps the outer side of the forearm, above the elbow, or on the outer side of the thigh—all places where there are no veins visible. The selected site is rubbed gently with a swab of cotton wool previously dipped in methylated spirit. Iodine will do. The syringe is filled from a sterile ampoule of solution. Sometimes little bottles of solution with rubber caps are used. Insulin is stored in this way. In this case the rubber cap is first cleaned with a swab

Giving an inhalation of amyl nitrite. In the case shown here the ampoule is wrapped in surgical gauze.

dipped in spirit, and then pierced by the needle, the solution being sucked into it.

With the syringe full and held in the right hand, the selected area is approached. A piece of skin is pinched up between forefinger and thumb of the left hand, the needle being pushed firmly into the base of the small eminence. Once in position the left hand can be removed and the plunger is steadily pressed down to its full extent. The syringe is then withdrawn with needle attached and the small puncture hole pressed with the swab of cotton wool. This usually suffices to stop any blood oozing from the prick. If it doesn't, then a drop of collodion stuck on with a wisp of cotton wool will certainly be sufficient to have the desired effect.

THINGS TO AVOID IN INJECTIONS

One or two words of caution about a hypodermic injection. The importance of extreme cleanliness or sterilization has been emphasized. The first injection, at least, should be performed under supervision of a trained nurse or doctor, so that any points of doubt may be cleared up. Secondly, it is dangerous to inject a hypodermic dose into a vein, so choose a veinless area as described, and if in any doubt withdraw the plunger of the syringe a little before making the injection. Should the needle be in a vein, dark blood will enter the syringe with this manœuvre and the syringe and needle should be taken out. Thirdly, make sure your needle is really sharp. With a sharp needle, hypodermic injection is accompanied by so small a prick that even a child would hardly object. But sometimes the needle gets bent right at the tip—so small a bend that it escapes the eye, yet it is enough to make the injection very painful. Such a needle must be picked out and thrown away.

After making an injection the syringe should be washed by filling with sterile water and emptying it several times. The needle should be taken off and its fine wire slipped through the hollow so as to protrude at both ends: and all the parts should be placed separately in a dish of methylated spirit.

Drugs may be administered by enema, through the back passage or rectum, where they are absorbed. Only a few are so given, but this may be an important route in the management of some cases. Enemas may be given also for their purgative results. They are described in detail in the chapter on the bowel. Suppositories also are used inserted by the finger into the rectum.

As we have already explained, many substances may be medicines or poisons according to the dose, and the circumstances in which they are taken. Arsenic is a very good example of such a substance. In fact, with the majority of poisons it is only because they have medicinal properties that they are available at all. There are, however, other substances which are pure poisons which find no place as medicines; carbon monoxide, is an example of this type of poison.

POISONS

The action of a poison follows the same rules as that of a medicine. If taken by the mouth, it may stain or burn the lips and throat (always signs to be looked for in a suspected case). It may irritate the stomach and even kill the sensitive mucous membrane which forms its lining. As it descends to the intestines it may irritate them, causing perhaps pain, diarrhoea and vomiting. From there the poison may be absorbed, passing via the portal blood stream to the liver, which is often badly injured in such cases. Finally, it enters into the circulation as a whole thence acting on various organs such as the brain or heart. Poisons are excreted, usually by the kidneys, which in this way cleanse the blood. Thus they, too, may be inflamed and injured.

From this very brief account it will be seen that in dealing with a case there are various stages, so to speak, where treatment can help.

STAGES OF TREATMENT

(1) Prevent any more poison entering the body. If, for example, a medicine bottle is suspected, take it away and keep it carefully. *Never destroy it or its contents*, as it may be very useful to the doctor, to whom it should be given at the first opportunity.

(2) Empty the stomach, where the poison often remains for some time before going farther on. This is done by making the patient sick. An emetic is a mixture given for this purpose. All vomited matter should be kept and given to the doctor.

(3) Neutralize the remaining poison in the stomach. For example, if the poison was an acid, such as hydrochloric acid, it is neutralized by magnesia or an alkaline powder, such as is commonly used for indigestion.

(4) Neutralize the poison in the blood stream. This may need an injection by the doctor into a vein.

(5) Neutralize its action on the organs which are poisoned.

Prevention of Poisoning is far easier and better than treatment. A few words on this are relevant. Most often poisoning occurs accidentally by someone, often a child, taking the wrong bottle and drinking the contents. Such substances as liniments or antiseptics are often swallowed in this way. Now poisons are put up in special bottles, not only clearly labelled "poison" but shaped differently from ordinary medicine bottles, so that they can be distinguished by touch in the dark. But poison bottles should never be kept in the same cupboard as ordinary medicine bottles—and if children are about poisons should be locked up. The other common example of accidental poisoning is error in taking a dose of medicine. We have mentioned before and re-emphasize how essential accuracy is here—and above all, never be so rash as to administer a double dose to make up for one missed.

KEEPING POISONS LOCKED AWAY

But poisons, though most often taken accidentally, may be taken from suicidal or given with murderous intent. Should you be living with a person who has perhaps threatened to take his own life, or has even been known to have attempted it, keep all poisons well locked up or hidden away, with the key always on your person. Mentally ill-balanced people should never have easy access to poisons.

The actual treatment of cases of poisoning varies, of course, to some extent with the poison used. We must first group the poisons then, as simply as we can.

(*a*) **The Corrosives.**—The first and most common group consists of those which eat away and burn the tissues with which they come into contact.

(*b*) **The Narcotics.**—These are absorbed into the blood, and act upon the brain, producing a loss of consciousness deeper than sleep, known as coma. Restlessness to the degree of delirium may also be present in some people. If this action predominates, the term "convulsant" is used.

(*c*) **Irritants.**—These irritate and inflame the bowels, producing diarrhoea and vomiting, with much abdominal colic and pain.

There is an important difference in

the treatment of corrosive poisons from the others. Since the stomach is partly eaten away, it is wrong to induce vomiting, which puts further strain on it, and might make a hole in it which would in itself be fatal.

Remembering these facts, and the stages of poisoning at which treatment can be directed, we can draw up a plan of treatment which is the basis for dealing with most poisons.

General Plan for dealing with a case of Poisoning.—(1) First, as soon as poisoning is suspected, call for a doctor without any loss of time, giving him your reasons for suspecting poisoning, and if possible what poison. If there is burning round the lips, it is a most important observation.

(2) Remove from the patient any container of poison—for example, cups or bottles. Lock them away safely and give them to the doctor when he arrives. Do the same with any vomit that may be found.

IMPORTANCE OF EMETICS

(3) Give an emetic (*Note*: Not if the lips and mouth are burnt with corrosive).

An emetic makes the patient vomit. The best and simplest emetics, are 1 tablespoonful of mustard powder or 2 tablespoonfuls of salt in a tumbler of warm water. Repeat this dose if no vomiting has occurred in a few minutes. Tickling the back of the throat with a feather is a classical method. But feathers not being so common in the average household, it seems quicker to use the finger wrapped in a clean rag which will have the same effect.

(4) Commence treatment for the particular poison, if known for certain, and not otherwise.

(5) For all poisons, after thorough vomiting, give milk, or milk beaten up with eggs, cream, olive oil. All these are useful whether the poison is corrosive or not, since they form a greasy layer on the mucous membrane and prevent further absorption or irritant action of the poison.

(6) Treat for shock. The more severe the poison, the more is the patient shocked, as shown by cold clammy skin, pallor, and a rapid thin pulse. The patient must therefore be kept warm and lying down. Hot-water bottles and blankets will achieve this. Do not give stimulants like brandy.

In many cases the above points will cover all that the home nurse should do while she is waiting for the doctor to appear to carry on further; and if these simple measures are taken they will be of greater assistance than vain attempts at more ambitious treatment.

CORROSIVE POISONS

This plan of treatment is modified in the case of a corrosive poison. Such poisons are: strong acids (sulphuric, hydrochloric, nitric, etc.); carbolic acid, certain other disinfectants and oxalic acid; strong alkalis, like caustic soda.

If one of these is known to have been swallowed, follow the general plan (without the emetic). Stage 4 of the plan will consist of neutralizing the poison in the stomach. If one of the acids has been taken, neutralize with a solution of alkali—magnesia, alkaline stomach powders, whitening, chalk; any of these if available is useful in doses of 1 tablespoonful to a tumbler of water. If caustic soda is the poison, then a weak acid such as vinegar, or lemon juice, with equal parts of water, is helpful. With corrosive poisons there is often much pain in the throat. Hot compresses and warm drinks will relieve this considerably.

Carbolic Acid.—This deserves separate mention, as it has not only

Treating an emergency case of poisoning (1) Groping in the cupboard a man pours out and swallows poison by accident. (2) The nurse tries to identify the poison and puts the bottle away for the doctor. (3) Immediately she gives the patient an emetic, then phones for medical aid. (4) While waiting she gives the patient milk to arrest the action further He is shocked so is wrapped in blanket. (5) The doctor on arrival gives an injection.

local corrosive action, but is rapidly absorbed into the blood and acts on the nervous system. Its smell will often make diagnosis possible. If possible, liquid paraffin (5 to 10 oz.) or Epsom-salt (magnesium sulphate), 1 tablespoonful to a tumbler, should be given. With *oxalic acid* (salts of lemon) chalk is the best neutralizer.

Irritant Poisons. — Special points arise regarding the management of a case of irritant poisoning. Examples of these poisons are arsenic, phosphorus, iodine, lead and certain fungi.

Our general plan holds right the way through here. With food poisoning, for example, poisoning from eating fungus, a mild purge may be given as well as an emetic. Epsom-salt (1 tablespoonful) would be useful. But do not give this if there has already been severe diarrhoea. With phosphorus poisoning no fats should be given, as these dissolve the phosphorus and aid its absorption so that it acts on the liver severely. Do not give milk or olive oil in such a case.

Narcotic Poisons.—These include opium, alcohol and barbituric acid. It should be noted that patients poisoned by this group of drugs may be in heavy sleep, in coma, or very restless and delirious. With opium or morphia poisoning the pupils of the eyes are "pin-point" or very small. These patients have usually cold and clammy skins, slow pulses and slow, sometimes sighing, respiration.

Treatment follows our general plan; added to which strong black coffee should be given by mouth, and smelling salts to stimulate the patient's breathing. Artificial respiration should be done if the respirations have become very shallow.

Opium, which contains morphine, is destroyed in the stomach by giving potassium permanganate — 2 tablespoonfuls to a pint of warm water, repeated in half an hour if necessary. A stomach wash-out with this solution is even better. This can only be done by a doctor, or in hospital.

Alcoholic poisoning as far as the home nurse is concerned will only be seen in the stage of coma. Treatment is along the same general plan—an emetic is often useful: a stomach wash-out even more so, but is often difficult to perform. Such a patient suffers particular danger from losing body heat and he must be kept warm with blankets and hot bottles. Hot coffee helps him to get over the after effects.

A last word on the treatment of poisons: master the general plan of attack, that is the most important thing of all. And remember the importance of time; do not waste a moment in getting medical aid.

CHAPTER VIII

THE NERVOUS SYSTEM

by S. T. HAYWARD, M.B., B.S.

(See also Part II. Chapter IV. Diseases of the Nervous System)

EACH part of the body has its special work to do: the special work of the nervous system is to direct and control that of all other parts of the body, and to see that these various parts work in full co-operation with each other; in addition, it enables us to think, to experience feelings, and to direct our energies in a purposeful way.

When we accidentally put our hand on something hot, we promptly pull it away; this is because the skin sends a message to the brain, and the brain sends a message to the muscles ordering them what to do. Small thread-like fibres are the paths along which these messages are sent, which connect every part of the body to the brain. Each fibre does not, however, travel to the brain alone, but joins with others like it to form a bundle, these bundles being called nerves. At the greatest distance away from the brain the nerves are small, but as they come nearer to it, they join with others to form bigger nerves. In the backbone many nerves are joined to form the spinal cord, which in turn is joined to the brain.

HOW NERVOUS SYSTEM IS MADE UP

The nervous system consists of the brain, the spinal cord and the nerves. The brain, situated inside the skull, is the most complicated part of the system (Fig. 1); from its lower part the spinal cord descends in a tunnel formed by the backbone, the brain and the spinal cord being connected to all other parts of the body by nerves. *Closely allied to the nervous system are the five organs of special sense: the eye for seeing, the ear for hearing, the nose for smelling, the tongue for tasting and the skin for the sense of touch.*

BRAIN AND SPINAL CORD

The brain and spinal cord are almost entirely surrounded by bone. Fig. 1 is a section taken through the middle of the head dividing the skull and showing the relationship of the brain to the surrounding bodily structures. The brain cavity is in the form of a vault with a domed roof, the roof and walls being made of thick bone, which is very strong. The bone forming the floor of the vault is uneven and is pierced by holes of varying size, whilst at the back of the floor is a cup-shaped depression which contains the hind brain. At the bottom of this depression is a large circular opening about the size of a shilling, through which the spinal cord leaves the brain cavity to enter the spinal tunnel. On each side of the centre of the floor are small holes through which the nerves and blood vessels to the brain have their entrances and exits.

The spinal cord is situated inside the spinal canal, this being formed by thirty-three separate bones of the backbone, each of which consists of a hard mass of bone in front (the body) fused to an arch of bone behind. Each separate bone is joined to those above and below by thick tough gristle; in this way a tunnel is formed (Fig. 4) stretching the whole length of the backbone. The gristle between each bone is pierced on each side by a hole; through these holes the nerves joining the spinal cord and blood vessels have entrances and exits.

THE MENINGES

The bony walls of the brain and spinal cord cavities are lined by two layers of tissue (the meninges), the layer nearest the bone being tough and thick; the other, nearest the brain and spinal cord, is thin and almost transparent. The meninges adhere closely to the nerves and blood vessels which penetrate the meninges in order to reach the brain. They are separated from the brain and spinal cord by a space of varying size. This space contains a fluid which in health looks like water; this fluid is called the cerebrospinal fluid. Running the whole length of the spinal cord is a minute canal, which at the junction of the brain and spinal cord becomes enlarged and forms hollow spaces within the centre of the brain. Within these hollow spaces (ventricles) are special glands which form the cerebrospinal fluid, which fills up all the hollow spaces within the brain, and flows over the surface of the brain and spinal cord.

The brain and spinal cord are protected then, firstly by a container made of bone, secondly, by the enveloping meninges, and thirdly, by this fluid.

FEEDING THE BRAIN

Four arteries enter the vault, two in front and two behind; the latter enter by the same hole as the spinal cord and join to form one. These three arteries on the floor of the vault communicate with each other and divide into six main arteries, each of which supplies blood to a particular portion of the

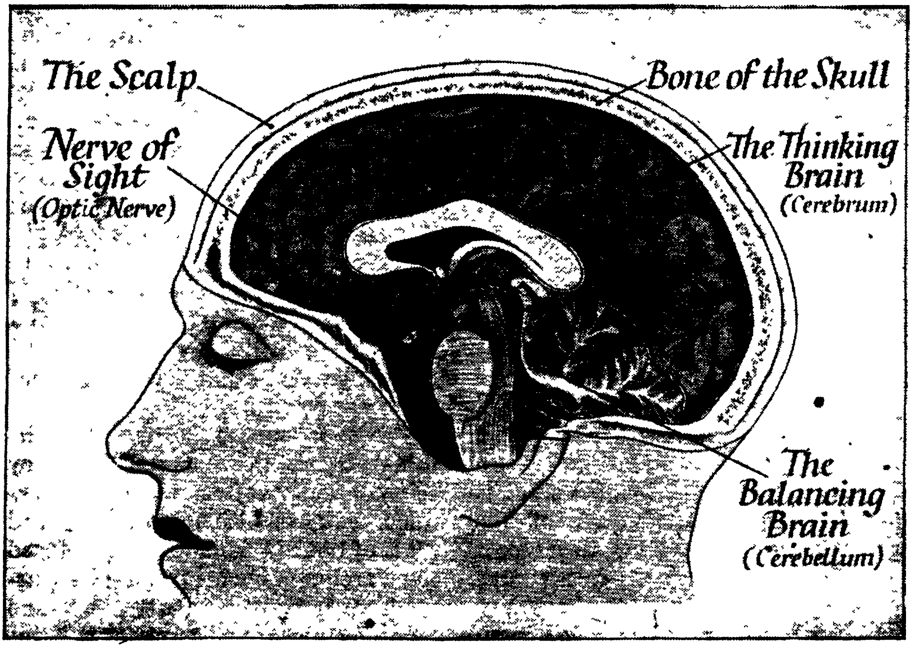

The Scalp
Nerve of Sight (Optic Nerve)
Bone of the Skull
The Thinking Brain (Cerebrum)
The Balancing Brain (Cerebellum)

Fig. 1. *The brain as it is situated inside the skull.*

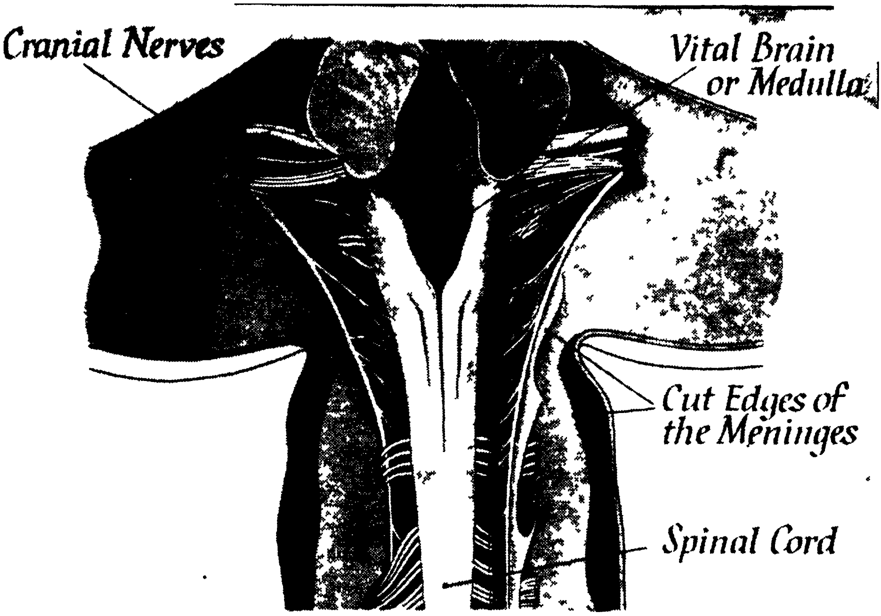


Fig. 2. *The brain as it descends into the spinal cord, showing the meninges.*

brain. The two front arteries supply the front and a considerable part of the inside of the brain, the two middle arteries supply the middle and the greater part of the outer surface of the brain, the two back arteries supply the back parts of the brain. Blood that has been used leaves the brain by the two jugular veins. The brain is therefore richly supplied with blood, so much so that in any disease or injury in which blood is lost, its supply is always in proportion much larger than that of any other part of the body.

THE NERVE UNIT

The nervous system consists largely of nerve cells, nerve fibres and nerve fibrils (Fig. 3). In addition there are cementing and protecting cells which support and protect the nerve tissue against damage and disease.

The nerve cell, nerve fibre and nerve fibrils are attached to form a single working unit—the nerve unit. The nerve unit acts by conducting messages. The nerve fibrils which arise from the nerve cell branch into fine twigs and spread in all directions around the cell, distributing and collecting messages to and from neighbouring nerve units.

The nerve fibre also arises from the nerve cell, transmitting messages to and from distant parts of the body. It is often inches, or even feet in length.

The nerve cell is the mothering element of the nerve unit; it attends to the nourishment and all matters concerning the efficiency of the unit: if this mothering cell is damaged the work of the whole unit is impaired.

Nerve units convey messages in one direction only. The receiving nerve units are those which convey messages from the body to the brain; these supply the brain with its information as to the condition of the various parts of

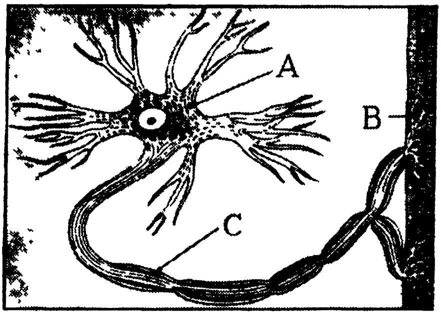


Fig. 3. *The nerve unit.* (A) *Nerve cell* (B) *nerve ending in tissue;* (C) *nerve fibre.*

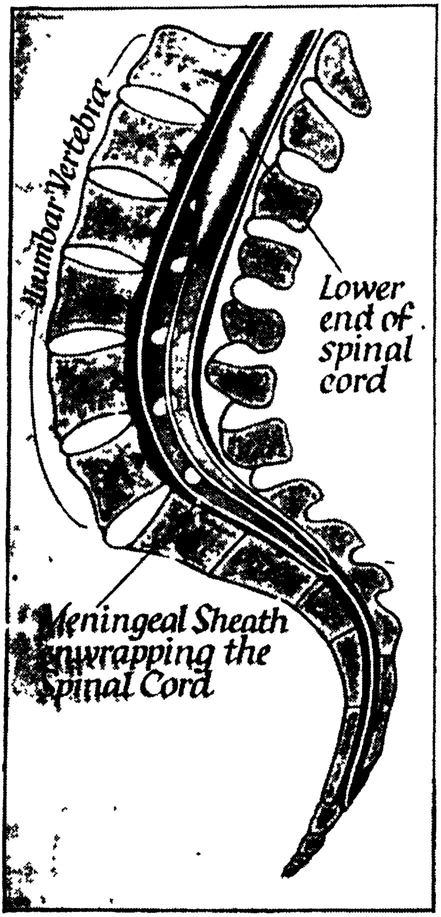


Fig. 4. *Part of the spinal cord. Inside the spinal cord you can see also the meningeal sheath and part of the backbone.*

the body, and also, by way of the organs of special sense, information as to what is happening in the outside world. The response nerve units convey messages from the brain to the body; by means of these messages the brain controls and directs the activities of the whole body. The correlation nerve units convey messages from the receiving to the response nerve units; the bulk of the brain is largely composed of these units.

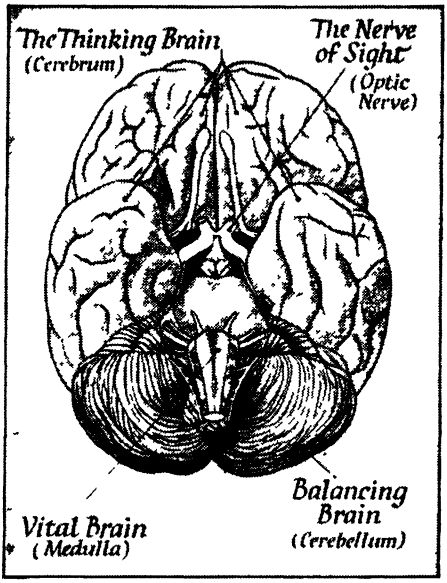


Fig. 5. *The bottom surface of the brain.*

Within the brain and spinal cord certain parts consist largely of nerve fibres. These are white in colour and are called white matter: other parts are largely composed of nerve cells; these are grey in colour and are called the grey matter. In the spinal cord the grey matter has roughly the shape of the letter H and is situated in the central regions of the cord. In the brain the grey matter is situated on the surface where it forms a layer about one-sixteenth of an inch thick. In addition there are large masses of grey matter embedded in the bottom of the brain (Fig. 6, lower drawing).

The messages conveyed to the brain by the receiving nerve units start in a sense organ. The body possesses many kinds of these but according to the type of information they supply they can be divided into two groups: firstly those that supply information about what is happening in the world outside the body, the eye, the nose, the ear, the tongue and the skin; secondly, the simpler but important sense organs which are scattered throughout the body in muscles, tendons and joints, these supply information as to position of limbs, the degree of tautness of muscles and how the internal organs are working Each receiving nerve unit conveys one particular kind of message only to one part of the brain, but all similar types of message go to the same area of the brain. so receiving nerve units from the eye convey messages of sight only to a special receiving area for sight on the surface of the brain

BRAIN SPECIALIZATION

With every fragment of information received the same process is repeated, the message is formed in the sense organ and conveyed by the receiving nerve units to the particular area of the brain which specializes in the receiving of that kind of message (Fig. 7). Messages of all kinds are constantly pouring into the brain Sifting of these is the work of the correlation nerve units, and these form a large part of the brain substance Messages are sent to the special response areas of the brain, from whence they pass along the response nerve units to the response organ response organs are muscles and glands (Fig. 8).

Correlation is the connecting link between the incoming messages and the outgoing commands; sometimes the work is simple, as when the hand is instantaneously pulled away when it touches something hot. The response is automatic and does not involve the complicated functions of thinking and memory at all. In much of our life the work is very complicated Suppose the information brought to the brain is that

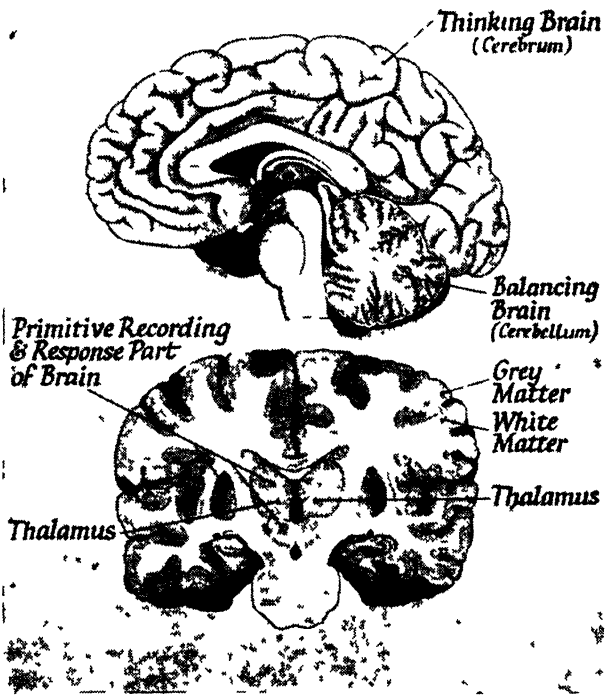

Thinking Brain (Cerebrum)
Balancing Brain (Cerebellum)
Primitive Recording & Response Part of Brain
Grey Matter
White Matter
Thalamus
Thalamus

Fig. 6. *Two views of the brain showing the various parts and also the masses of grey matter.*

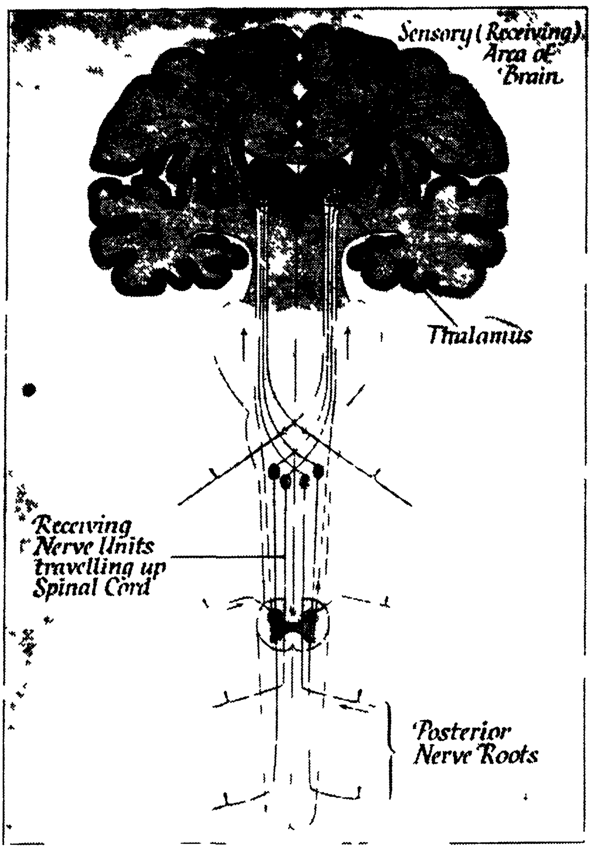

Sensory (Receiving) Area of Brain
Thalamus
Receiving Nerve Units travelling up Spinal Cord
Posterior Nerve Roots

Fig. 7. *The nerve system of the sensory, or receiving area of the brain, showing the path of receiving nerve units.*

the individual is hungry; the response to this is naturally to eat; but much work of correlation may have to be done before this response can be achieved. Firstly, the individual will have to think about, and decide what he will eat; this may well involve adjusting what his imagination desires to the actual food supply available. After the choice of food is made, it will have to be collected and prepared; perhaps a chicken killed and cooked, or vegetables collected from the garden. It is therefore clear that the work of correlation varies from simple automatic acts to the most complicated and intricate functions of our being.

The various parts of the brain are the fore brain, the mid brain and the hind brain. It is in the great development of the fore brain that man is so superior to every other animal. Fig. 9 shows the brain of a frog, a rabbit and man, and from these diagrams it is clear that, in proportion, the fore brain is far greater in man than in any other animal: in fact, in the man the fore brain is roughly nine-tenths of the total brain.

GREY MATTER

The fore brain is divided into two equal parts, a left and a right, by a deep cleft. The great bulk of the fore brain consists of the thinking brain, but embedded in the under part on each side are two large masses of grey matter; these form the primitive receiving and response brain.

The grey matter of the thinking brain is wrinkled and lies on the surface; different areas of this grey matter specialize in particular kinds of work. Fig. 10 is a diagram of the outer surface of one half of the thinking brain showing these special areas. The main response centre is situated in a wrinkle of grey matter about midway between the front and back of the surface. It will be noticed that in this area, the legs are represented at the top and the head at the bottom as if the body were turned upside down. From the nerve cells of this area nerve fibres run to all the muscles of the body. In front of this area is a response memory area where complicated responses are built up. Behind this area is another wrinkle of grey matter which is the receiving station for messages from the skin and muscles. Behind this again is a receiving memory area in which memories of previous experiences are stored. At the back of the brain is the receiving area for the sense of sight, and around it is the sight memory area. At the front of the thinking brain is a large area which is thought to be the centre for the most developed function of the brain, that to do with character. At the lower part of the outer surface is the receiving area for hearing surrounded by a large hearing memory area: in front of this and a little higher up on the left-hand side only is the special response area which is concerned with speech.

THE SPEECH CENTRE

For some curious and quite unexplained reason, each half of the intelligent brain does not, as would be supposed, deal with the affairs of the corresponding half of the body, but deals with the affairs of the opposite half; thus the right half supervises the left, and vice versa. The centre for speech is, however, present on one side of the brain only, the left-hand side in right-handed people, and the right-hand side in left-handed people.

The primitive receiving and response brain consists of one mass of grey matter (the thalamus) which is a receiving area, and another mass of grey matter (the striate body) which is a response area. This part of the brain is highly developed in birds, but in man much of its activity is taken over by the thinking brain; thus most of the messages arriving in the receiving area are relayed straight on to the thinking brain.

This part of the brain does, however, do work of two kinds. Firstly, it is responsible for many automatic bodily movements, and secondly, it helps to maintain the normal degree of tautness present in muscles even when they are not actively working. Many

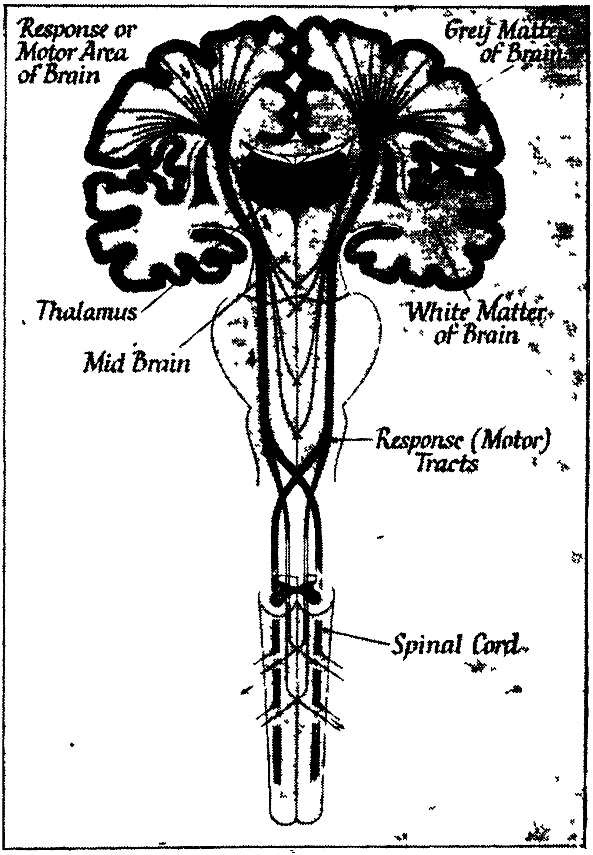


Fig. 8. *The nerve system for the motor, or response area of the brain, showing the path of response.*

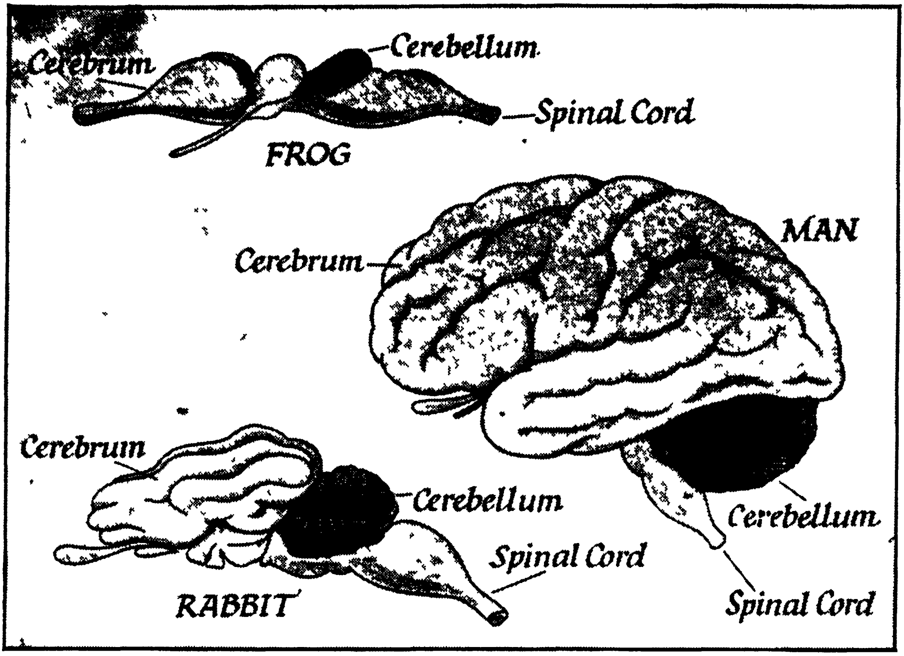


Fig. 9. *Diagram to show the evolution of the brain from the frog's primitive brain to the man's highly developed brain. Notice the developed fore brain in man (page* 106).

complicated activities, such as dancing, have to be laboriously learnt; this is the work of the thinking brain, but once this process of learning is complete, many parts of the activity, especially the rhythmic parts, are banished to the primitive brain and become automatic, thus leaving the thinking brain free for other tasks. It is probable that in this region of the brain the deep urges of mankind, such as self-preservation and sex, have their origins. Under the influence of the thinking brain the means of satisfaction of these urges become vastly complicated, and we can distinguish a large number of emotions and sentiments; among the most important are love, hate, fear and anger.

The mid brain is small and consists almost entirely of white matter connecting the fore brain with the hind brain and spinal cord: at its uppermost part it divides into halves, one half going to each side of the fore brain.

The hind brain consists of the vital brain and the balancing brain. The vital brain is a direct continuation of the spinal cord below and merges into the mid brain above it: it is in the vital brain that the centres of life are situated, the beating of the heart, the mechanisms of breathing, the distribution of the blood, and the working of the internal organs. These are all controlled in this part of the brain.

THE BALANCING BRAIN

The balancing brain is a large mass attached to the back part of the vital brain: it receives messages from the muscles of the body giving information as to how taut they are, and also from the balancing organ which is situated within the base of the skull near to the hearing organ: this balancing organ forms messages as to the position of the body in relation to gravity. The response part of the balancing brain co-operates with the automatic and thinking brain; it is responsible for maintaining the balance of the body and also helps to regulate the tautness of muscle. For instance, riding a bicycle has to be learnt. This is the work of the thinking brain, and the work required in balancing is later banished to the balancing brain and becomes automatic.

WORK OF WHOLE NERVOUS SYSTEM

We have sketched out briefly the details of the working of the nervous system, in which we found that every part has its particular job of work to do in relationship to the whole. We have realized that the nervous system controls and directs all the rest of the body. In addition to this we have to consider its work as a whole, which is really a study of the individual in relationship to other individuals and the world he lives in; and it is in this sense that the word "mind" can be used. The study of the whole from this particular point of view is called psychology.

An example will perhaps make these facts clearer. A motor car although perfect in every detail and structurally intact requires, before it can function, two things: petrol and a driver. Petrol is like the vital energy of the individual, and dependent on the amount of vital energy that the individual possesses in his output of work and success in life.

The driver represents the organization of the individual in regard to the emotions and sentiments. These may be organized so as to work harmoniously in one direction, in which case the individual tends to be more successful in achieving his desires in life; or the individual's energies may be spent in

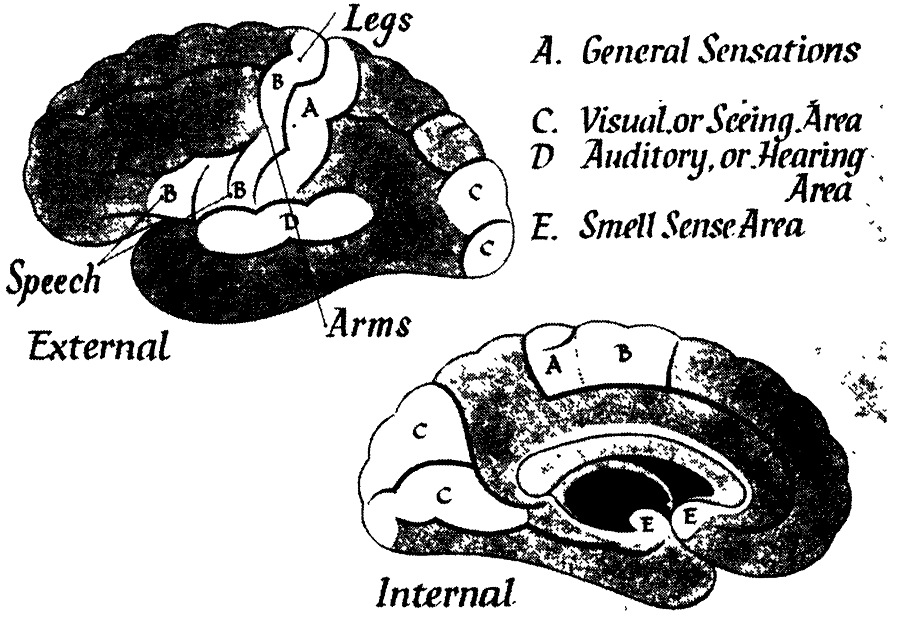


Fig. 10. *Diagram showing the external and internal view of the brain.*

clashing between the emotions so as to produce disharmony and bad results. In our analogy, a well organized individual is comparable to the efficiently driven car, while in the unorganized individual, though the car is perfect, the driver is inefficient, and instead of pursuing his way direct, may be held up in collision with other individuals; or instead of pursuing his journey, may stop somewhere on the way or change his direction. On the organization of the emotions and sentiments depends the use of the vital force of the individual; this organization gives to the individual purpose and direction in life. In addition to the organization of the individual from the point of view of purpose, there is his organization from the point of view of intelligence, his ability to learn, to think, to remember and to imagine. Also there is his organization of response, his ability to carry out complicated tasks involving control over his muscles. The sum of these three aspects, namely purpose, intelligence and response, are given the name "personality."

SYMPTOMS IN NERVOUS DISEASES

Symptoms of faulty working of the nervous system are produced by two quite different types of disturbance: firstly, as a result of disease in which nerves, nerve units, or parts of the brain are damaged or destroyed; secondly, from disorder of the activity of the nervous system as a whole. In this second group it is the individual himself that is ill; it is a disorder of the essential self and not of any component part. For these two types of disturbance the terms "disease of the nervous system" and "disorder of the personality" will be used. Illness resulting from disorder of the personality occurs commonly in the absence of disease of the nervous system or of any other part of the body; but disease of the nervous system or disease in any other part of the body frequently produces some degree of disorder of the personality. Disorders of the personality such as irritability, continual worrying and sleeplessness are very common among the sick.

Paralysis.—Paralysis is loss of power of muscular action; it is due to the nervous messages not reaching the muscles. This happens when the response areas of the brain or the response nerve units are diseased or damaged; the extent of the resulting paralysis will depend upon the extent of damage to the nerve units.

There are various types of paralysis according to where the nervous messages are cut off. If this occurs in the brain or spinal cord the paralysed muscles are usually over-taut and do not show a great tendency to waste. If, however, the nerve messages are cut off nearer the muscles, either in the nerve or where the nerve joins the spinal cord, the muscles are flabby and show a great tendency to waste away. It is common to find in paralysed parts that there is also a change of sensation; that is, both receiving and response nerve units are damaged.

Changes in Sensation.—Changes in sensation are due to disease or damage to some part of the receiving nerve units, or the receiving areas of the brain; there is an interference with *incoming* nerve messages from the body to the brain. Let us consider the possible resulting changes in detail, and take for our example the leg. If there is a complete stoppage of incoming nerve messages there will be a complete loss of sensation in the skin; sense of pain, touch and temperature will completely disappear; pins can be passed through the skin, or it can be burnt without the patient having any knowledge of it unless he sees it happening, even then he will not feel pain; in the same way he cannot feel the limb being touched or stroked. There will be no messages coming in from the muscles or joints, so that if the eyes are closed he cannot tell where the limb is, whether it is bent at the knee or whether it is straight. In fact, even though the muscles may be quite all right he can only control the movements of the limb by looking at it all the time. In disease there is sometimes a complete loss of sensation such as this, but frequently there is only a partial loss; the limb may become insensitive to pain and temperature, but touch may remain normal; or the skin sensation as a whole remains normal but muscle sense is absent.

Loss of Control of Sphincters.—The emptying of the bladder and the rectum are under the control of the brain; messages in health are sent to the brain giving information as to when these organs require emptying. In disease this function is often lost, and the bladder or rectum just empty automatically when they are full, without the individual realizing it.

Delirium is due to poisoning of the brain cells which results in chaotic activity. The patient is excited and restless, he cannot control his bodily movements, he is usually frightened, incapable of rational speech, and can only talk in an incoherent and muddled fashion. He frequently sees horrible and terrifying visions. This intense activity will, unless relieved, lead to exhaustion, in which everything is seen through a haze. The patient cannot recognize people or his surroundings, his talk is a meaningless jumble. If delirium occurs in an individual who is already seriously ill, it is usually characterized by exhaustion; occurring in a perfectly healthy individual it is frequently characterized by activity.

Coma.—Coma is a state of profound unconsciousness, from which not only is the patient unrousable, but also there is no response to strong stimuli, such as pinching the skin or touching the eyeball. It is frequently preceded by drowsiness, from which the patient can be roused for a short while with difficulty. It is caused by damage to a large part of the brain substance, or to a great increase of pressure within the skull; the result is that all parts of the brain except the vital brain are put out of action. If the coma is severe or prolonged the vital brain itself will become damaged, and if this happens the patient will die.

Convulsions or Fits.—In convulsions there is a sudden terrific over-activity of the response area of the brain, so that messages for activity are sent to all the muscles of the body. The patient loses consciousness, falls to the ground, becomes blue in the face, froths at the mouth and twitches violently for several seconds; then all is quiet, and after about ten minutes consciousness returns, when the patient, except for feeling somewhat sleepy, is none the worse for the attack.

TREATMENT IN NERVOUS DISEASES

Paralysis.—1. The paralysed parts of the body must be rested.

2. The paralysed parts must be kept warm and protected from injury.

3. Paralysed limbs must be maintained in such a position, by splints if necessary, as will reduce as far as possible the ultimate deformity.

Changes in Sensation.—1. Because these patients have no proper sensation of pain, touch, etc., every care must be taken to prevent injuries occurring; they may burn themselves without realizing it; special care must be exercised in the use of hot-water bottles, and splints used to prevent injury.

2. In bed-ridden patients extra care is necessary in order to avoid bed-sores. It appears that apart from the direct results of injury, any part of the body which has lost its nerve supply is also poorly nourished, and as a result is unduly prone to injury.

Loss of Control of Sphincters.—1. The mattress should be protected by a mackintosh sheet.

2. Dirtied sheets must be changed immediately.

3. The patient must be cleansed and the skin treated. This is particularly important in the prevention of bed-sores (*see* pages 42 to 44 and 47 to 48).

Coma.—1. The patient should be nursed on his back.

2. The head should be placed in the position in which breathing is most easy; either flat without a pillow, or with one pillow, and sometimes with the head on one side.

3. He should be left quiet and no attempt made to disturb or rouse him except by the doctor's orders.

4. The patient will have loss of control of sphincters, so the bed should be protected by a mackintosh sheet.

5. The patient is unable to swallow, so no attempt should be made to give him fluid in any form.

6. Further treatment will depend on the cause of the coma, and can only be carried out by orders of the doctor.

Delirium.—1. Remember the patient is very muddled and everything seems queer and confused; he needs, above all, something permanent and unchanging that he can cling on to. It is important, therefore, always to wear the same clothes, to talk in the same tone of voice, to convey the impression all the time of permanent unchanging security. Sitting beside the patient's bed and facing him, preferably doing such simple work as knitting, all the time on the alert to anticipate his needs, is a very great help. Holding his hand, smoothing his forehead accompanied by light pressure, is often comforting and soothing. Noise and sudden movement is frightening to the patient, therefore everything should be done calmly and evenly.

2. Sleep is very important as it helps to combat exhaustion, and every effort should be made to see that the patient sleeps well. The doctor will usually order a sedative for this.

3. Food. Drinks should be given at frequent intervals. If the patient is flushed and dry, there should be cool fruit drinks containing plenty of glucose. Milk drinks or eggs beaten up in milk should be given to help keep up the patient's strength unless the course of the delirium demands other dietary.

4. Care of the mouth. The mouth is apt to become dry, and as a result may be a fertile source for the breeding of bacteria and further absorption of poisons (*see* section on care of mouth in illness, pages 29 and 42).

Convulsions in Infants.—Convulsions in children frequently occur at the onset of any disease associated with fever, or may occur as a result of indigestion or constipation.

1. Loosen the clothing, give plenty of fresh air and apply cold compresses to the head. This is sufficient in a mild attack.

2. In more severe attacks, the child should be immersed in a warm bath (temperature 100 to 105 degrees) for five minutes, a cold compress being applied to the head.

3. In more severe cases still, suitable sedatives will be ordered by the doctor.

4. After the attack the child should be kept quiet. The diet should consist of easily digested foods and the bowels moved by an aperient.

Treatment of a Fit or Convulsions in Adults. 1. Leave the patient where he is if possible.

2. Place a pencil rolled in a handkerchief between the patient's teeth to prevent him biting his tongue.

3. Place the patient flat on the floor lying on his back with the head turned to one side.

4. Loosen all tight clothing.

5. Remove anything near the patient with which he might injure himself.

6. When the fit is over, take the patient to a couch or bed and make him as comfortable as possible, and allow him to sleep as long as he wants to.

Special points to notice in order to tell the doctor:—

(*a*) How the fit starts and whether twitching seems to start in one part of the body before another.

(*b*) Colour of the face, whether pale, ashen, or blue.

(*c*) Whether the tongue is bitten, and whether frothing at the mouth occurs.

(*c*) Whether the patient passes water during the attack.

Insomnia (Inability to sleep).—In acute cases it is usually due to pain, fever, shock, or to a severe emotional upheaval. In chronic cases it is most commonly due to a disorder of the personality, though it may occur as the result of a chronic painful illness, in which case it is the pain which keeps the patient awake. Many chronic cases of insomnia worry greatly about it, so much so, that it is frequent to find that it is the worry over whether they will sleep or not which does in fact keep them from sleeping.

In acute cases the doctor will probably order á drug; this should be given after the patient has settled down comfortably for the night, and should be followed by a drink of warm milk.

Chronic Cases.—1. Drugs should be avoided as far as possible unless there is pain, when they should be used sparingly in sufficient doses only to remove the pain.

2. The most important single factor is the behaviour of the nurse; a quiet, reassuring but firm attitude helps a great deal; all actions should aim at reassuring and soothing the patient.

3. Raising the head, a hot-water bottle to the feet and a rubber hot-water bottle on the upper part of the abdomen all help.

4. Sponging the hands and face with warm water are often helpful.

5. If the patient is well enough, such simple tasks as cutting his own toenails, brushing his hair, and so forth, are useful; these all help to take the patient's mind off his trouble and in themselves are unexciting.

6. A warm drink of milk or a simple herb drink such as camomile tea are soothing; tea and coffee should be avoided for about three or four hours before bedtime. Some elderly people find a small tot of whisky helpful.

7. If sleep is lost in the early hours of the morning, tidying the bed, rearranging the pillows, and a warm drink will usually suffice to send the patient off again.

Symptoms Resulting from Disorders of the Personality.—This is a very complicated and difficult subject. Disorders of the personality vary from unhappiness, through a whole range of mild disorders to a group of severe disorders to which the name insanity is given. It is the lot of humanity that mild disorders of the personality are so common that probably none of us goes through life without at some time suffering in this way. Sleeplessness, irritability, worry and nervous breakdowns are symptoms of these disorders. Their causes come into the field of psychology and we must leave the discussion of them to a later chapter.

CHAPTER IX

THE LUNGS AND HOW WE BREATHE

by G. W. HAYWARD, M.D., M.R.C.P.

(See also Part II. Chapter VIII. Diseases of the Respiratory System)

THE respiratory or breathing system is that part of the body which is concerned with supplying air to the lungs so that the oxygen of the air can be made available for the needs of the body.

The nostrils lead to the inside of the nose, which has a wrinkled lining, warming and moistening the air and acting as a filter to remove any germs which may be in it. The nose communicates with the throat around the back of the palate, the throat thus having the double function of conveying air to the windpipe and food from the mouth to the gullet. A small tube passes from the throat on either side just behind and above the tonsil, and leads to the inner part of the ear. Germs sometimes spread along this tube from the throat and they may infect the ear causing earache and deafness.

From the throat, air passes through the voice-box or larynx into the windpipe, and the opening into the throat is protected by a sort of valve, so that food which is being swallowed cannot get into the larynx by mistake. If food "goes the wrong way," it means that you have tried to swallow and breathe at the same time, and the food gets drawn into the larynx, to start an attack of coughing. The windpipe is a round tube about one inch across, starting below the larynx and leading down into the chest to divide there into two main branches—the bronchi—each of which takes the air into one lung. In the lung, the bronchi split up into numerous smaller branches, just like a tree, the finest twigs of these branches taking the air into little balloon-like structures with very thin walls, and here the oxygen from the air is taken into the blood.

STRUCTURE OF THE LUNGS

The lungs themselves are sponge-like structures made up of the air-containing passages which have been described and numerous blood vessels. The blood which is pumped into the lungs by the heart is blood which has returned from all the rest of the body, having given up its oxygen there and received in exchange waste products. The main blood vessel to the lungs splits up into branches just as the bronchi do, and so the blood is led to the balloon-like structures. Here an exchange takes place; the waste products pass through the thin lining wall into the air passages to be got rid of when the person breathes out, while oxygen passes from the air into the blood. The small veins containing this purified blood join up to form larger veins which take it back to the heart, to be pumped around the body again.

The surface of each lung is covered by a smooth, shiny membrane called the pleura and the inside of the chest wall is lined by a similar membrane. When the lung expands, these two membranes can run smoothly over one another, separated only by a small amount of lubricating fluid.

The lungs are contained within the inside of the chest, the walls of this cavity being formed by the chest wall on the sides and closed below by a dome-shaped sheet of muscle called the diaphragm. When a person breathes in, the muscles of the chest make it expand, and the diaphragm contracts downwards, so that the lung also expands and air is sucked in. During expiration or breathing out, all of these muscles relax, elastic recoil makes the chest return to its original size and air is forced out. Normally, this process takes place sixteen to eighteen times a minute, the rate being adjusted so as to supply just the right amount of air to the lungs which is needed at that time.

The larynx is situated at the upper end of the windpipe, so that all air entering or leaving the lungs passes through it. On each side of the wall of the larynx is a fold of the lining membrane called the vocal cord. These cords are connected with small muscles so arranged that the length of the cords, the tension in them and their distance apart can all be varied. During ordinary breathing the cords are relaxed and wide apart, so that there is no obstruction to the passage of air, but if speech is desired the cords become tightened up and the air passing over them makes them vibrate like reeds to produce a noise. Modification of this noise by the tongue and lips produces speech.

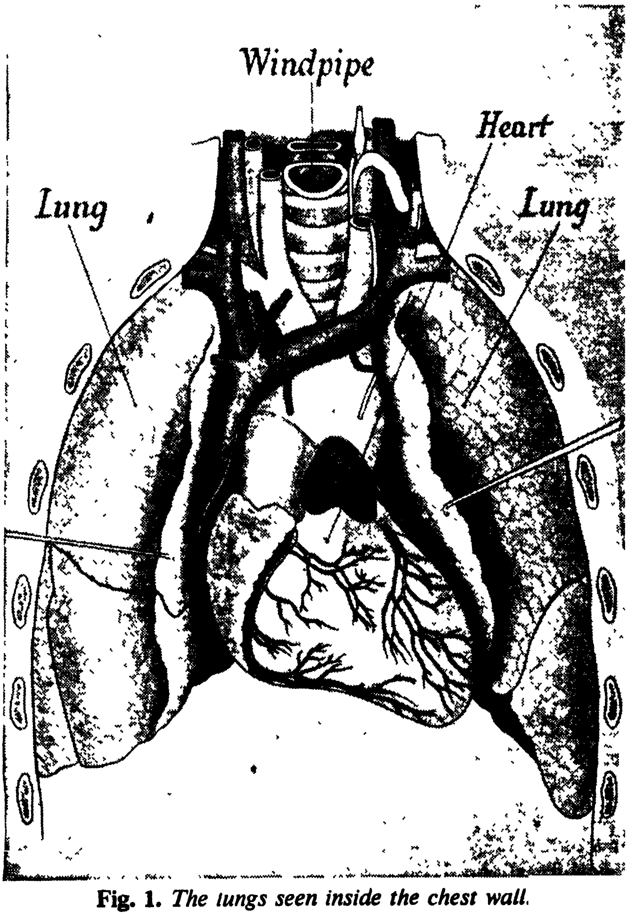


Fig. 1. *The lungs seen inside the chest wall.*

SYMPTOMS IN RESPIRATORY DISEASES

Cough.—The lining membrane of the larynx and upper part of the windpipe is very richly supplied with nerves and is therefore very sensitive to anything touching it. Phlegm, working its way up from the bronchi, reaches this sensitive area, at once irritates it and

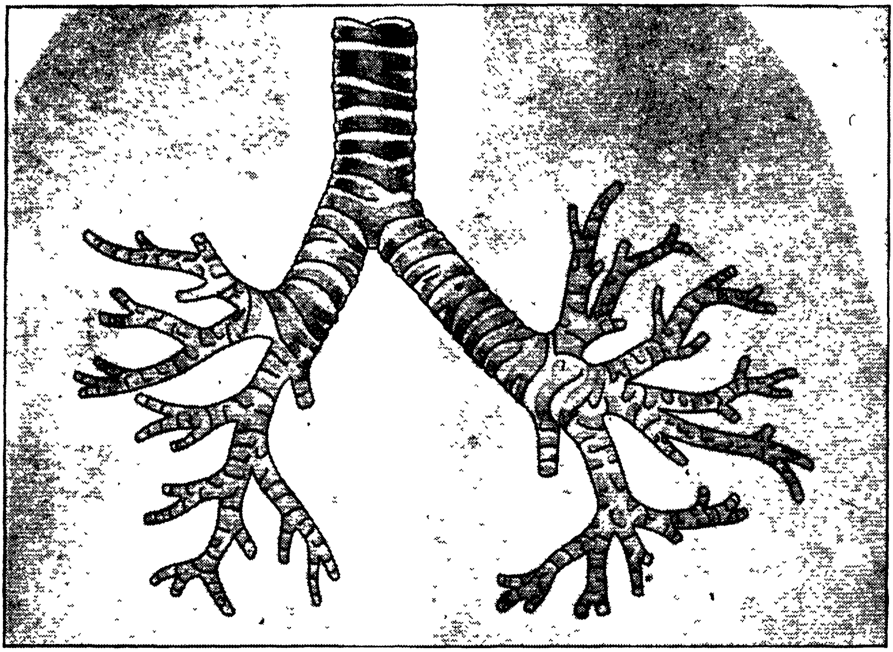


Fig. 2. *The bronchial tree leading into the lungs.*

makes the person cough. The sudden expulsion of air from the lungs will tend to drive out the cause of the irritation.

Phlegm or Sputum.—The inside of all the air passages is normally kept moist and protected by a layer of sticky fluid or mucus, produced by small glands in the windpipe and bronchi. If there is any inflammation of the lungs (pneumonia), or bronchi (bronchitis), the amount of this mucus becomes much increased; when it reaches the larynx it makes the person cough and bring up phlegm. The phlegm in bronchitis is yellowish in colour, not very copious in amount; in the early stages of pneumonia it is rusty-brown, while in tuberculosis it is often streaked with bright red blood.

Catarrh.—If the lining of the nose is inflamed or irritated, again an excess of mucus is produced and obstructs breathing through the nose. The mucus runs backwards into the throat and gives rise to a tickling cough, often worse first thing in the morning.

Hoarseness.—Inflammation of the vocal cords in the larynx makes them swell, and so when the person tries to speak they are no longer able to vibrate normally, and the voice becomes hoarse. The extra mucus present often causes a cough as well, although very little phlegm may be brought up in this condition.

Pain in the Chest.—This is the outstanding symptom of pleurisy or inflammation of the membranes covering the lungs and the inside of the chest. These, instead of sliding smoothly one on the other as the lung expands and contracts, become roughened, and the rubbing together of these roughened membranes causes pain. This pain is sharp and stabbing, usually on one side of the chest only, and is made worse by coughing and deep breathing. Sometimes a pain very similar to that of pleurisy may be caused by a strain, or rheumatism of the muscles of the chest wall, without any inflammation inside the chest.

Difficult Breathing and Shortness of Breath.—Difficulty in breathing occurs in many conditions affecting the respiratory system, but shortness of breath is more commonly due to diseases outside the respiratory system, particularly heart disease. Difficulty in breathing is caused by some obstruction to the air passages, either in the larynx, as in laryngitis, or in the bronchi, as in asthma where the bronchi become constricted.

Blueness or Cyanosis.—The blood which enters the lungs to be purified is bluish in colour, having given up its oxygen to other parts of the body and received waste products from them. Normally, in the lungs, oxygen is taken up and the purified blood becomes bright red in colour, but if the lungs are diseased, as in pneumonia where part or the whole of one lung becomes solid, some unpurified blood may be present in the blood leaving the lungs to be redistributed to the body and so the patient will look blue.

SPECIAL TREATMENTS

Inhalations.—Special vessels are sold for giving inhalations, but the ordinary quart jug is equally effective. The jug should be half filled with almost boiling water, to which has been added a teaspoonful of friar's balsam; the mouth of the jug is surrounded with a towel whose ends are gathered up to form a funnel which conducts the steam to the patient's mouth and face, and he inhales the vapour. A few drops of oil of eucalyptus or a single crystal of menthol may also be added to the water. Do not copy the mistake that is usually made of adding too much of these, so that the inhalation, instead of being soothing, only irritates the patient's chest and provokes coughing attacks. With any of these inhalations the eyes should be kept outside the towel, otherwise they will water and hurt.

Bronchitis Kettle and Tents.—When the doctor orders you to give steam inhalations to a child with bronchitis, some sort of bronchitis kettle should be used. The kettle resembles an ordinary kettle, but the spout is about 2½ feet long. If it is not an electric kettle it is kept boiling by a small spirit lamp and is supported on a stand which is placed by the side of the bed. The spout should point towards the head of the bed but its end should not be over the bed-clothes, as it may drip and wet

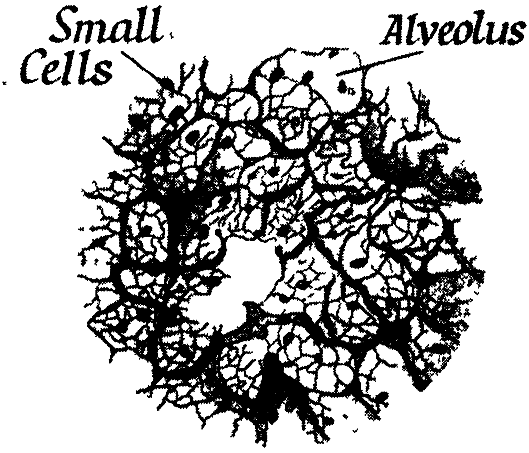


Fig. 3. *Air passage inside the lung tissue.*

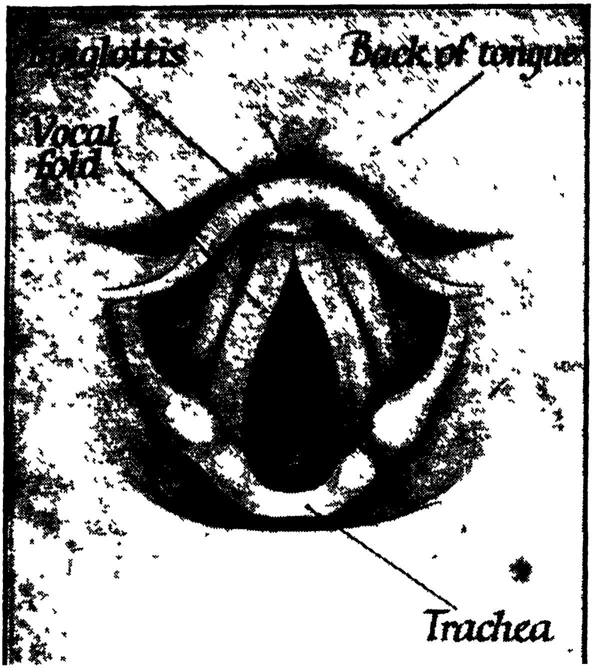


Fig. 4. *The larynx or voice-box; looking down throat.*

them. The steam from the kettle alone will moisten the air of the room, but it is well worth the extra trouble to try to improvise some sort of tent so that the steam is concentrated around the head of the bed. A screen around the head of the bed, covered with a sheet, works quite well. The steam by itself is a help to the patient, but one or two teaspoonfuls of friar's balsam may be added to the water in the kettle. This form of treatment should be carried out for about half an hour at the end of every two hours.

Nose Sprays and Droppers.—In some cases of catarrh or a cold in the head, nasal sprays and droppers may be used to apply antiseptics or astringents—substances which shrink and soothe the inflamed and swollen lining membrane of the nose and clear the head. Most sprays which can be bought at the chemist's are worked by a rubber bulb which when pressed sends out a mist or spray from the nozzle. The nozzle should be placed just inside each nostril in turn, and as the bulb is pressed the patient takes a deep breath through the nose so that the mist is carried inwards and reaches all the recesses of the nose.

Nasal droppers are used for a similar purpose, and commonly some oily solution is used. If the patient stands upright, throws his head backwards and then puts a few drops inside the nostril, they will almost certainly just run backwards along the floor of the nose into the throat without ever having a chance of doing the work they were intended to do in the nose. It is much more effective to lie flat on the back, preferably with a small pillow under the shoulders, throw the head as far back as possible and then insert the drops and sniff gently.

Strapping the Chest with Adhesive Plaster (*see also* pages 230 and 231).—Pain in the chest on breathing, due to pleurisy or rheumatism, is greatly relieved if movements of the affected side of the chest are prevented by using adhesive plaster. The widest plaster available should be used—preferably two and a half to three inches wide—and before applying this to the chest, the skin should be washed with soap and water, dried, then painted with friar's balsam and allowed to dry. This will prevent the skin being irritated by the plaster which is otherwise likely.

The first strip of plaster should be put on the lowest part of the chest,

Inhaling. The photograph above shows an inhaler. That on right shows how inhaler is used. The bottom photograph shows another method of inhalation. A towel is placed over the head and a jug containing an infusion of friar's balsam. If the eyes are sensitive, try the method on page 117.

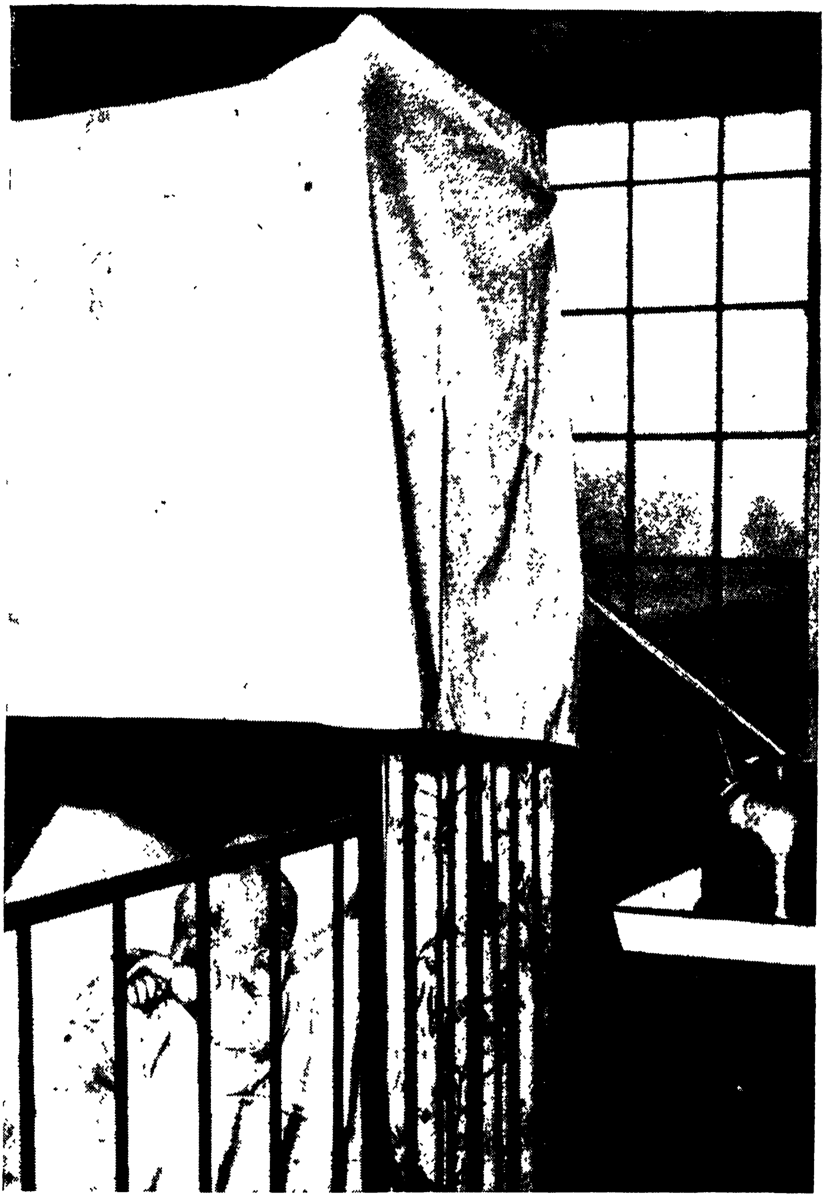
working upwards with succeeding layers, each overlapping the one before. Apply the end of the first strip just beyond the midline on the unaffected side of the chest. Then get the patient to breathe out as deeply as possible and hold the breath there for a moment while the plaster is quickly carried round the affected side, its end going beyond the midline at the back. Three or four strips of wide plaster should be enough, each overlapping the previous one for about half an inch, and being applied at the moment when the patient has breathed out.

Applying Poultices (*see also* pages 228 and 229).—Pains in the chest, joints or limbs are often relieved by a hot plaster of antiphlogistine or kaolin; the latter is cheaper and equally effective. Both may be purchased in tins at any chemist's shop. As usually applied, they are messy and soon lose their heat, but it is quite easy to make a clean, efficient poultice which will retain its heat for many hours. Place the tin containing the antiphlogistine or kaolin in a saucepan filled with enough boiling water to reach half-way up the side of the tin and simmer for about fifteen minutes to heat the plaster all through. Don't have too much water in the saucepan as it will splash into the tin and spoil the contents.

While this is going on, cut a piece of lint or old linen a little larger than is necessary to cover the affected part and place it smooth side up on a table. When the antiphlogistine is ready, tip it on to the lint and spread it smoothly. A large knife with the blade well heated in boiling water should be used as a spreader. Fold over the edges of the lint for about half an inch all round and use this folded-over part to lift the plaster. Before applying to the chest or other part, test the temperature with the back of the hand as it is very easy to cause serious burns if the poultice is too hot. It should be as hot as can be borne comfortably. When it is ready, it should be applied to the affected part and loosely fastened with a wide bandage. Such a plaster will retain its heat for many hours, and usually requires to be renewed only once a day. It may be reheated by placing it flat between two plates and heating these over a saucepan of boiling water.

If the plaster is being applied to the chest, and both sides are affected, it should be put across the back, with the edges coming round to the front, but leaving a gap of about eight inches

An electric bronchitis kettle. The same shape can be obtained which can be used with a gas ring or spirit stove.



A bronchitis tent for a child. This photograph shows how easily a bronchitis tent can be "rigged." A screen has been placed around the head of the cot and a sheet fitted over the top and pinned at the back. Notice that the spout of the kettle is inserted at the join of the sheet and the screen behind the head of the child. The steam from the kettle is concentrated around the head of the bed. Thus the child gets the full benefit of the inhalation but the scalding steam is nowhere near his face. The spout of the kettle is also so directed that the condensation of the steam will not drip on to the child's pillow.

between them. This makes breathing easier than having the whole of the chest covered up.

Linseed Poultice.—This is made with linseed meal. Take a well heated bowl and pour into it a little boiling water. Then sprinkle into this the linseed meal, stirring all the time until all the water is taken up and the mixture does not stick to the sides of the bowl. Spread the mixture as described for the kaolin poultice on lint or muslin, using a heated spoon, fold in the edges, test the temperature with the back of the hand to avoid burns and apply. Cover with a layer of cotton wool and bandage in position. This poultice must be renewed more frequently than the kaolin one, usually at the end of every three or four hours.

Mustard Poultice.—Occasionally a stronger poultice is required, and then the mustard poultice is useful. It is made as above, using a mixture of one part of mustard to three or four of linseed. A mustard poultice should be left on an adult for only half an hour, and for fifteen to twenty minutes on a child, otherwise blistering will occur. It must not be repeated without special orders from the doctor.

Mustard Plaster.—A simple mustard plaster can be made by mixing equal parts of wheat flour and mustard into a paste with warm water and spreading the mixture between two layers of muslin. As an alternative, a mustard leaf may be purchased. It should be placed in tepid water for a few seconds until it is thoroughly moistened, then the excess moisture shaken off. The mustard plaster or leaf should be applied to the affected part, covered with wool and bandage and left on for fifteen to twenty minutes—not longer, as it is very easy to blister the skin. At the end of the application the skin underneath should be bright red in colour; it should be covered with cotton wool for a few hours afterwards until the redness has subsided.

Administration of Oxygen.—Oxygen is often of the greatest value in treating pneumonia cases, while it may also be ordered by the doctor for some cases of heart failure. When oxygen is ordered, the relatives always imagine that the patient has taken a sudden turn for the worse and get alarmed. Actually, the doctor is usually taking a wise precaution in giving oxygen as soon as he sees that the patient would be benefited by breathing more oxygen than he can get from the air. In this way complications later in the illness can often be effectively prevented.

Oxygen is supplied compressed in iron cylinders, and the gas is released by turning a knob. The older method of giving oxygen by means of a glass funnel connected by means of rubber tubing to the cylinder and held over the patient's face is absolutely useless and a waste of oxygen, as the amount of oxygen reaching the lungs is negligible. The intermittent use of oxygen for fifteen minutes every hour or two hours is also quite ineffective. If a patient needs oxygen at all, he needs it continuously for many hours and sometimes days.

FIXING THE APPARATUS

There are many ways of giving oxygen effectively, and the best for use in the home is illustrated in the photographs (*see* pages 226 and 227).

Two small soft rubber tubes like cycle valve tubing are inserted for two to three inches along the floor of each nostril and are kept in position by adhesive plaster. The doctor may supply some ointment with which to lubricate these tubes so that they do not irritate the inside of the nose. They are connected by means of a Y-shaped tube to a water bottle through which the oxygen bubbles. This moistens the oxygen and also shows how fast the gas is flowing. The oxygen is led to the water bottle from the cylinder by means of another rubber tube. The rate at which the oxygen should flow will be stated by the doctor; usually this will be at as fast a rate as it will bubble through the bottle without blowing out the rubber bung. The soft rubber tubes in the nose should be removed for cleaning purposes once or twice in the twenty-four hours.

It is important for the nurse to remember that oxygen is a highly inflammable gas, and a naked light should not be brought near the patient while he is receiving oxygen.

Artificial Respiration is used to restore breathing when it has stopped, and the two common conditions requiring it are electrocution produced by the patient coming into contact with live electric wires, and drowning.

Place the patient on the ground or any flat surface, with his face downwards and his back uppermost. The head should be turned slightly to one side and the arms should rest comfortably by the sides. Before starting artificial respiration, be sure that there is no mechanical obstruction to the air passages; remove any false teeth, food or anything which is in the mouth, and also put a finger gently over the back of the tongue to be perfectly sure there is nothing there.

The following instructions are those advised by the Royal Life Saving Society, with some slight alterations.

"To perform artificial respiration, place yourself on one side of the patient facing the head in a full kneeling position, with knees and hips bent. Put your hands on the small of the patient's back, the wrists nearly touching, the thumbs as near as possible without strain and the fingers passing over the loins on either side, but not spread out.

"Then, bending your body from the knees and somewhat straightening the hip joints, swing slowly forward so that the weight of your body is conveyed to your hands. No exertion is required, as the necessary pressure is imparted by the weight of your body. In this way the patient's abdomen is compressed against the ground; the abdominal organs are forced against the diaphragm; the diaphragm rises and air is driven out of the lungs, along with any water or phlegm which may be present in the air passages and mouth, and so the patient breathes out.

The correct method of using a nose spray. As the bulb is pressed, the patient takes a deep breath through the nose.

"Next, swing your body slowly backwards into its first position, thus removing its weight from the hands (which are left in place) and relaxing the pressure on the abdomen. The organs thus resume their former position, the diaphragm descends, the chest is enlarged and air passes into the lungs so that the patient breathes in. Repeat the movements regularly about twelve times a minute, swinging your body alternately forwards and backwards from the knees.

"Every such double movement will occupy about five seconds, two of which may be taken up by pressure (breathing out) and three by relaxation (breathing in); to ensure regularity you may count five slowly. Your arms should be kept straight the whole time, not bent at the elbows. Continue these procedures until there are signs of recovery, shown by the reappearance of natural breathing. If this is ineffective or tends again to cease, artificial respiration must be resumed."

The movements should be smooth and regular, not violent, and not faster than twelve to fifteen times a minute. Heavy persons should not apply their full weight, especially for children, as the internal organs may be damaged. The hands must be placed on the loins, not on the chest.

There is another method for use if the patient must be kept lying on his back. Lay the patient on his back, with his arms stretched out sideways. Kneel astride the legs, facing the head, and place the hands on the front and sides of the lower chest. Compress inwards for two seconds, release the pressure suddenly when the chest will expand by its own elasticity. Pause for two seconds and repeat. This method is tiring, there must be someone to hold the tongue forward, and it is not as effective as the first method.

CHAPTER X

FOOD AND ITS VALUES

by F. AVERY JONES, M.D., M.R.C.P.

(*See also Part II. Chapter II. Feeding the Invalid*)

POOR nutrition in this country today plays an enormous part in causing chronic ill health, poor physique, diminished vitality and increased liability to infection. The solution to the problem is partly an economic one requiring an enlightened Government food policy, but fortunately the housewife can do much to increase the health of the nation by understanding and applying the basic principles of correct nutrition. A tremendous amount of work has been done by doctors, physiologists and research chemists in discovering the constituents of food and the essential requirements of the body. Each one of us should know how to apply that knowledge in a practical way in our homes. It is necessary first to consider the constitution of the normal diet.

Food must provide for growth, upkeep and work. It must contain:—

1. Body-builders: proteins and salts.
2. Fuel for body activity: carbohydrates and fats.
3. Health providers: vitamins.
4. Water.

Very few realize that three-quarters of solid food is water that can be utilized by the body; seventy per cent of a beef steak, fifty per cent of bread and more than ninety per cent of green vegetables is really water. The body needs about four and a half pints of water a day, to allow for an adequate volume of urine to excrete the waste products of the body, and to provide for water loss from the skin and lungs. About two of these four and a half pints are obtained from solid food. This is an important point to remember, for an invalid patient unable to take solids should be given at least four and a half pints of fluid a day.

PROTEINS

Proteins are essential for building and repairing the body cells. Unfortunately, man cannot manufacture the essential proteins from their simple elements: carbon, hydrogen, oxygen and nitrogen. Proteins are combinations of simpler chemical units, the amino-acids. There are more than twenty amino-acids alone and six of these are indispensable for growth and repair of body tissue. Proteins derived from animal sources—meat, fish, milk, cheese and eggs—contain these necessary amino-acids, while proteins from vegetable sources, e.g., rice and maize, may be deficient in one or more of these elements. That is why vegetable proteins alone are an inadequate source, and would lead to defective bodily growth. So-called strict vegetarians obtain their essential amino-acids from the milk which they consume, in addition to their nuts and greenstuffs. Actually only a small proportion of protein is used in tissue repair; much is burnt by the body as fuel for energy.

The real sources of energy are fats and carbohydrates.

Carbohydrates may be divided into two main classes: simple soluble carbohydrates such as sugar, and simpler carbohydrates such as starch or cellulose.

GLUCOSE AND SUCROSE

Cane sugar or sucrose is a chemical union between two sugars: glucose and fructose. The body breaks down cane sugar into these two sugars and converts fructose into glucose, and this is the sugar which is normally present in the blood. It is readily absorbed from the intestine and quickly utilized by the body. It is not quite so sweet as cane sugar and is therefore used in preference when large amounts need to be given with a fluid diet. Starch is a polysaccharide, that is, it consists of many glucose molecules bound together. Cereal foods, for example, flour, maize, rice, oatmeal, contain seventy to ninety per cent of starch, which is also found in many vegetables such as potatoes, parsnips, peas and beans. All of these starch-containing foods provide glucose which can be turned into physical energy and heat by the body. Cellulose forms the cell walls of plants, vegetables and cereals. It is a polysaccharide which the human intestine is unable to digest, and it forms the so-called roughage which is necessary for the proper functioning of the bowels.

IMPORTANCE OF FATS

Fats are the other main source of body fuel, and weight for weight give twice as much energy as carbohydrates or protein. Moreover, they are an essential part of the body cells. Butter, lard, dripping and fat of meat are typical animal fats; there are also important vegetable sources which provide margarine and olive oil.

The minerals of the body are sodium,

potassium, calcium, phosphorus, magnesium, iron, chlorine, bromine, iodine, sulphur, copper, manganese, zinc. Fortunately, if the diet contains enough calcium, iron, and in some districts, iodine, the other minerals can look after themselves. Calcium is important because it is the foundation of the bony skeleton, and an adequate supply is necessary in pregnancy and for children when bones are being formed or strengthened. Milk, cheese and green-leaved vegetables are the foods which are rich in calcium.

IRON AND IODINE

Iron is an essential part of hæmoglobin—the red pigment of the blood, and a deficient supply of iron leads to the too prevalent anæmia. Iron-deficient anæmia both in children and adults is still prevalent in this country. Liver, eggs and brown bread are the main sources of iron. Milk contains very little iron, and babies fed with diluted cow's milk may become anæmic and need small amounts of medicinal iron. Iodine is needed for the thyroid gland and a deficiency causes goitre. Incredibly small amounts are required by the body, an adult needing 1/1500 ounce every year. The sea contains a considerable amount of iodine and as long as the diet contains fish, there is not the least danger of a shortage of iodine.

The vitamins are chemical substances which have to be present in a diet if full health is to be enjoyed. A deficiency of some of the vitamins is still a big cause of subnormal nutrition and poor health in this country. There are at least ten vitamins concerned in human nutrition, and there are probably others which have not yet been identified. By brilliant chemical research work, eight of the vitamins have been isolated, that is, it has been found out exactly what they are composed of, and so they can be manufactured in laboratories. This has already meant an improved national diet, for the Government have arranged for vitamin B1 to be added to white bread, and vitamins A and D to margarine. Before the war of 1914-18 many of the poorer people suffered serious shortage of the essential food factors.

These vital substances have been named after various letters of the alphabet; they fall into two main groups—those which are soluble in fat and those which are water soluble.

IMPORTANCE OF VITAMIN A

Vitamin A preserves the health of the skin, the eyes and the mucous membranes of the body. When there is serious deficiency, as for example, in Denmark during the 1914-18 war when all the butter was exported, the eyes may become hardened and opaque and blindness follows. Children are especially susceptible to this condition which is known as xerophthalmia and there were many cases in the war of 1914-18. It was noted that these children were especially liable to develop bronchopneumonia, probably as a result of the poor resistance of the mucous membrane of the bronchial tubes.

VITAMIN A AND "CAT'S EYES"

A minor degree of vitamin A deficiency is shown by inability to see in a poor light, and after sudden exposure to a bright light there is complete dazzling for longer than usual. Vitamin A deficiency may therefore play a part in causing road casualties at dusk and during the night. We obtain vitamin A from fruit and vegetables which contain a yellow colouring matter, carotine—carrots, peaches, apricots, oranges. Carotine is also present in green vegetables but its colour is masked by the green colouring matter called chlorophyll. The amount of carotine depends on the sunlight which leaves have received. That is why the green outer leaves of a cabbage are a much better source of this ingredient than the white leaves of the heart.

Carotine is changed into vitamin A and is stored in the liver. Milk, butter and cream are extra sources of vitamin A which has been derived from the green grass eaten by the cow. The richest source of vitamin A is in the fat of fish; herring, salmon, mackerel, sprats are good sources, but especially fish livers; and so we have cod liver oil and halibut oil. This vitamin has come from the minute green sea vegetations, algæ, which are a source of food to many fish. Animal fats, excluding lard, and egg yolk are other sources of vitamin A; it is soluble in fat and is scarcely affected at all by ordinary cooking temperatures.

VITAMIN B

Vitamin B, which is soluble in water, is now known to consist of a number of different vitamins and it is possible that not all of them have been isolated.

Gross deficiency in vitamin B1 causes beriberi, a crippling disease which has been a great scourge in the East where the staple diet is polished rice. Beriberi is extremely rare and uncommon in this country. Gross vitamin B deficiency is mostly seen in chronic alcoholic subjects who appear to be quite unable to absorb the vitamin B1.

SYMPTOMS OF VITAMIN B1 DEFICIENCY

Moderate deficiency of vitamin B1 is common at the present time in this country and there is evidence to suggest that an increase in the vitamin B1 content of the diet would materially improve the health of the nation. Restriction of vitamin B1 in healthy people otherwise adequately fed gives rise, among other signs and symptoms, to loss of appetite, constipation, moodiness, sluggishness, indifference, fear and mental and physical fatigue. It is probable that vitamin B1 deficiency played a part in the collapse of the public morale in Germany in 1918; hence the anxiety of the British Government to augment the vitamin B1 intake by its addition in white bread.

SOURCES OF VITAMIN B1

The chief sources of vitamin B1 in the English diet are wholemeal bread, pork, bacon and ham, liver, eggs, whole cereals, porridge, nuts, peas and beans. Certain proprietary products are rich in vitamin B and can conveniently be used to augment the vitamin B1 intake.

Vitamin B1 is almost confined to the embryo of the cereal grain, and modern milling processes of wheat and rice remove this embryo along with the husk. The chief reason for the milling is the increase in time for which the grain can be stored, because unfortunately the embryo fat tends to become rancid. The improved appearance and better selling power of milled rice and wheat are also an important consideration. Beriberi was rare before the end of the nineteenth century when new milling processes were introduced. It seems rather absurd to mill wheat and remove vitamin B1, make white bread and replace its vitamin B1 content artificially at a cost of £12,000,000, but this is really a wartime necessity for carrying large stocks of grain. The minute quantities involved can be judged by the fact that only one ounce would be obtained from sixty tons of yeast. Actually vitamin B1 is now manufactured and not extracted from its natural sources.

The P-P (pellagra-preventing) is another unit of the vitamin B content and its deficiency causes inflammation of the skin, diarrhoea and nervous disease. Though pellagra is common in the southern states of U.S.A., southern Russia and northern Italy, where maize is the staple diet and where poverty prevents a sufficient allowance of meat, it is extremely rare in this country, but it may occur in mental hospitals in patients who are difficult to feed. It can be prevented by taking sufficient animal protein.

There are other members of the vitamin B family but, generally speaking, if the diet is rich in vitamin B1 there will be a sufficient allowance of the other B vitamins.

VITAMIN C

Vitamin C prevents scurvy, a disease better known to the seventeenth century sailors than to us nowadays. It was the long ocean voyages without fresh fruit or vegetables which caused the general weakness, swelling of the gums, hæmorrhage into the skin and breaking down of old wounds. Lack of vitamin C may damage the developing teeth in children and predispose to dental decay. In adult life an adequate intake is probably necessary for the health of the gums and for protection against pyorrhœa. Although true scurvy is rare in this country, occurring chiefly among people on crank diets, a subnormal intake is probably a factor in contributing to the frequency of dental decay, pyorrhœa and dyspepsia. At the beginning of the century it was very common for infants to develop scurvy when they were fed with sterilized artificial milk with no fresh milk or fruit juice. Fortunately it is rarely seen now, as welfare clinics and all women's papers emphasize the importance of giving orange juice to babies.

The chief sources of vitamin C are fresh fruit—oranges, lemons, grapefruit, black currants (a rich source), strawberries, red and white currants, raspberries, loganberries and gooseberries: salads with watercress, tomatoes, radishes, mustard and cress or raw cabbage, sprouts and turnips which can be used in salads.

SOURCES OF VITAMIN C

Unfortunately apples (except Bramley seedlings), cherries, pears, grapes, plums, runner beans, carrots, lettuce, onions and parsnips contain little or no vitamin C. The potato is a poor but not unimportant source, and the potato famine in Ireland was followed by an epidemic of scurvy. Much of the vitamin C is destroyed by cooking or lost into the water on boiling. This is why vegetables should be steamed when possible and potatoes cooked in their jackets. There is less loss in the cooking of fruit because their cooking juice is usually consumed. Fortunately, with modern canning methods much of the vitamin C is preserved. It has been discovered that the vitamin is a comparatively simple chemical compound, ascorbic acid, and this can be manufactured. Large amounts of ascorbic acid are now given to people who have to undergo big operations, for it is known that it greatly assists the healing of the flesh.

VITAMIN D

The recognition of vitamin D has led to the virtual disappearance of rickets from this country, but even twenty years ago half the children in big industrial areas suffered from this illness which caused softening of the bones, predisposed towards infections and increased the infant mortality rate. The bony distortion of the pelvis helped to contribute to the maternal mortality.

Vitamin D, unlike the other vitamins, can be manufactured by the body, but this needs exposure to sunlight. Rickets is therefore seldom seen in the tropics, and was especially common in industrial areas where the smoke and dust in the air absorbed the vital rays which act upon the skin. Vitamin D is soluble in fat; it is sparsely distributed among foodstuffs, occurring in considerable quantity only in fish oils, egg, liver, milk and butter, and consequently it is deficient in the diet of many people.

Vitamin E is the so-called anti-sterility vitamin. Its chief sources are wheat germ oil and lettuce.

Vitamins P and K are yet two more vitamins and they are concerned with the health of the blood capillaries and with the clotting of blood. Deficiency states probably occur only in association with certain serious illnesses and are of little general interest.

WHAT OUR FOOD SHOULD SUPPLY

In this country today there are comparatively few cases of gross vitamin deficiency, but there is a great proportion of the population who have the least ratio that is necessary to keep going, rather than that amount which makes for perfect health, and who therefore do not derive all the possible benefits of an adequate and complete diet. Adults can exist, and die at a good old age, on the minimum intake, but there is much evidence that during the growing years of life only a high vitamin intake will ensure complete growth and vigour.

The next step is to turn this knowledge of foodstuffs to the improvement of our daily diet. Our food must supply:—

1. Energy to cover the day's work.

The fats and carbohydrates to drive the human engine. Bread, cakes, potatoes, dried fruit, sugar, butter, margarine, lard and dripping are its fuel.

2. Body-building materials to make up the wear and tear, and to allow for growth.

Our main protein foods do this work and supply some energy as well. These are eggs, milk, meat, poultry, game, cheese, liver.

3. The vitamins and minerals with the so-called protective foods which guard the body against disease and allow natural, unhindered growth.

They include the dairy foods, special fruits and salad vegetables, oily fish, germ of cereals, liver and the flesh (not fat) of the pig.

ENSURING A BALANCED DIET

The normal appetite and food habits of the British ensure an adequate supply of the body-building and energy-providing foods, but custom does not always supply all the protective foods, even in the households of the wealthy, and but seldom among those of the poor. It is not entirely a matter of shillings and pence, but it is true that the protective foods are not the cheapest. Often a slight redistribution of the household budget, however, can greatly improve the diet. Lack of knowledge still takes a toll on the public health but should rapidly diminish thanks to the excellent instruction from the Ministry of Food in the daily Press and on the morning radio. The supreme importance of the protective foods is clearly recognized by the Government, and the price of all essentials is carefully controlled.

The diet will be protected if it includes each of these three groups: —

1. Milk—1 pint a day.
   Butter or vitaminized margarine —1 oz.
   Cheese—1 oz.

2. Raw salad or raw summer fruit or fresh foreign fruit; orange, lemon, half grapefruit or 2 bananas.
3. Two servings per week of any of the following: herring, sprats, kipper, bloater, whitebait, salmon, mackerel, fish roes.

THE VALUE OF MILK

Milk is particularly valuable because it supplies protein, salts, vitamins as well as energy from fats and carbohydrates. One pint of milk contains the same amount of protein as four eggs, or 2½ oz. cheese, or 3 oz. roast meat or fish. The protein in milk is known as "first class" and alone would be a sufficient source of protein. For children and pregnant women especially it is the calcium content which makes milk so valuable. One pint of milk is worth 750 milligrammes calcium but 4 eggs would supply only 40 milligrammes and 3 oz. of fish or meat less than 10 milligrammes. So 2½ oz. cheese is a close competitor with 650 milligrammes.

Many people dislike raw milk but they may enjoy milk soups, or cocoa or chocolate, made with milk. Allowing ½ pint of milk a day for tea, cereals or milk puddings, the other ½ pint should be taken in one of these ways. It is best to make a habit of either a morning glass, or else a warm drink before going to bed.

The most convenient way to add our second group to the diet is to include either half a grapefruit or the juice of an orange in the breakfast menu. But these come from abroad and in wartime may be restricted by scarcity or price. There are excellent home sources of the vitamin C which this group contributes to the diet. A tea time salad with watercress, mustard and cress, tomatoes, radishes or even raw sprouts or cabbage will contain a considerable quantity of this essential ingredient, and will go far to make up for the loss of other sources.

Even though the Government is adding vitamin B1 to white bread, it is still better to order at least equal amounts of white and wholemeal bread. It is not only the vitamin B1 but also the iron in wholemeal bread which makes it important. White bread merely supplies energy, but wholemeal bread also prevents anæmia. Undoubtedly most people prefer white toast, and a satisfactory compromise would be to serve white toast with breakfast and supper, and wholemeal bread for lunch and tea.

THE OSLO BREAKFAST

Some years ago an Oslo school gave its children a meal planned to make up the protein, mineral and vitamin deficiency of their home menu. They were given wholemeal bread (iron and vitamin B): goat's milk cheese and milk (first-class protein and calcium): half an apple or orange, lettuce salad or a raw carrot (vitamin C): and a pat of butter (vitamins A and D). With such a meal at school it did not much matter how inadequate the diet might be at home. The experiment was a real success, as has been its trial on a small scale in this country. It has been suggested that this "Oslo Breakfast" could best be given as an English tea. Drummond and Wilbraham in their book on the Englishman's food have said of the "Oslo Breakfast":—

> "It seems to offer a simple and effective solution of the major problem of nutrition as we see it in England today."

There seems no doubt that it is better to include the natural sources of the vitamins in the diet rather than rely on the many concentrates now on the market. If there should be any doubt or difficulty in getting an adequate vitamin intake for children who may be intolerant of fish or brown bread, the deficiency can be remedied by cod liver oil and malt, or vitamin A and D concentrates and a packet vitaminized cereal.

Many people take concentrated vitamins but if the diet is carefully planned this is an unnecessary expense. The natural vitamins are much the best sources. If we rely on concentrates we may be missing some food factors at present unknown. It is possible to have too much vitamin D, but there is a margin of safety of about twenty times the allowance that is most beneficial. For those who take the concentrated vitamins, the following figures will give an indication of the actual requirements of the body:—

VITAMIN A	*International units daily*
Growing children	6,000—8,000
Adults	2,000—4,000
During pregnancy	5,000

VITAMIN B	*International units daily*
Children	300—500
Adults	500—700
During pregnancy	1,000

VITAMIN C	*International units daily*
Children	1,000
Adults	3,000

VITAMIN D	*International units daily*
Infants (6 months)	1,000—2,000
Children	2,000—5,000
Adults	200—500

Although countries cannot agree about gold and tariffs and non-aggression, the excellent work of the League of Nations has enabled them to formulate international standards of purity for many chemical substances, including the vitamins.

CHAPTER XI

THE URINARY SYSTEM

(See also Part II. Chapter X. Diseases of the Urinary System)

EVERYBODY has two kidneys. They are shaped like broad beans, about three to four inches long, one inch thick and about one and a half inches wide, situated at the back of the abdomen on each side of the spine. The concave side faces centrally, the blood vessels and nerves coming in on the central side. These organs lie behind all the other contents of the abdominal cavity, directly on the muscle wall of the abdomen at the back, just below the diaphragm, which separates them from the lungs. As the right kidney has the liver above it, it is situated rather lower than the left.

In front of the left kidney is the stomach and just above and to the left of it is the spleen. The kidneys are surrounded by fine capsules and on the upper poles are two yellow gland masses about one to one and a half inches long. These are the adrenal glands. If a kidney is divided so that the structure may be seen, one finds that there is a smooth outer part, the cortex. This is about a quarter of an inch wide and under the microscope is seen to consist of innumerable small tubules. The inner portion of the kidney within the cortex is called the medulla, and from this the tubules collect into a series of twelve to sixteen little pyramids which point into the

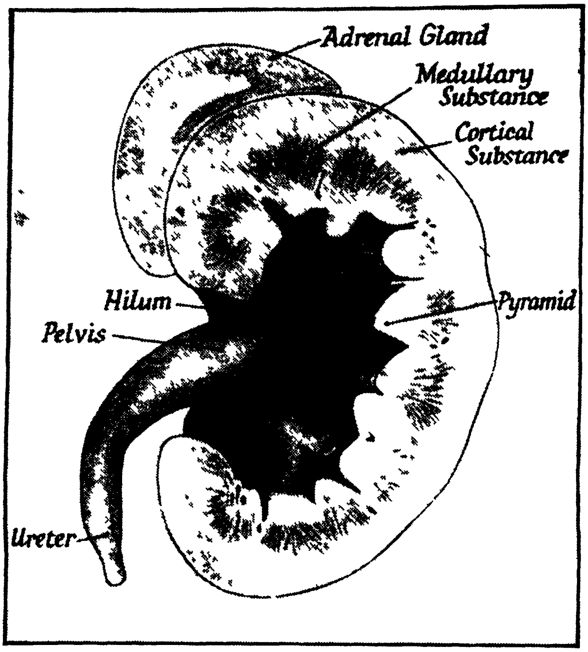


Fig. 1. *The kidney, showing the various parts.*

pelvis of the kidney. This pelvis of the kidney is a pouch or collecting sac on the central side of the kidney, and it receives the urine from the tops of the pyramids which surround it.

The bladder is situated in the lowest part of the abdomen, far from the kidneys which are high up under the diaphragm. Joining the two, running from kidney to bladder, are two muscular drainpipes—the ureters. These convey urine from the kidneys to the bladder.

The bladder is a muscular storage tank situated in the lowest part of the abdomen, just in front of the rectum. It is normally small, the size of a large grapefruit, but the size varies with the urinary content. It excretes its contents according to the patient's wishes, for when it becomes sufficiently distended with urine it causes the desire to pass water (micturate). When the patient passes water the bladder contracts and urine is forced to the exterior through a channel called the urethra which opens to the exterior of the body at the tip of the penis in men, and just in front of the vaginal opening in women. In the male there is a gland, the prostate gland, just below the bladder and the urethra passes through this before entering the penis. In the female the urethra has a close relation to the front wall of the vagina.

STRUCTURE OF THE KIDNEY

The structure of the kidney is marvellously intricate, for it consists of thousands of little filter beds (the glomeruli) leading into drainage tubes (tubules) which finally enter into the pelvis of the kidney. The whole organ is very richly supplied with blood vessels. These blood vessels form little balls of tangled vessels in the glomeruli with only a thin layer of cells overlying them, thus allowing the fluid to pass readily from the vessels into small channels which open into the tubules. These tubules are also richly supplied with blood vessels, and much of the fluid filtered off from the blood stream is absorbed again from the tubules into the circulation, the effect being, therefore, to concentrate the substances which are excreted in the urine. The number of these little functioning units of glomerulus and tubules is in excess of the everyday need of the person, so the kidney can suffer quite marked damage by disease or injury before its functions suffer.

The main function of the kidneys is to filter off water and the substances dissolved in it from the blood stream, so as to keep the blood free from impurities that would otherwise accumulate and act as poisons. The actual filtering is performed by the small filter beds, or glomeruli, fluid passing from the blood vessels to the tubules, which drain it away. Much fluid is reabsorbed in the tubules, causing a saving of the fluids and allowing the abnormal constituents to be excreted in plenty in relatively small amounts of water. The kidney, therefore, not only filters, but concentrates, and one of the early signs of diminished function is impaired concentration, the urine passed being more diluted and containing a smaller percentage of solids. Finally, a stage comes when all these impurities cannot be excreted and they accumulate in the blood stream, so bringing about the condition called uræmia and the patient is seriously ill.

The blood contains many substances which are kept at fairly constant concentrations by the kidney excreting any excess of them. Many of these are waste products from the digestion of food and the best known is urea. Ammonia also is excreted and is unusual in that it appears to be actually manufactured in the kidney. In addition to its excreting function, the kidney—by excreting acids or alkalis—helps to keep the body reaction normal, neither acid nor strongly alkaline.

DIURETICS

Different drugs have different effects on the kidneys. Those drugs which cause an increase in the excretion of the urine are called diuretics. These drugs are used in conditions where fluid is not being passed normally, and is being retained in the tissues of the body, causing swelling (œdema).

Some drugs act as kidney irritants and may do harm, and others given to increase the output of urine may, if given at the wrong time, also damage the kidneys. Such damage is shown by hæmorrhage from the kidney, and perhaps some frequency in passing water. There are a number of drugs useful in

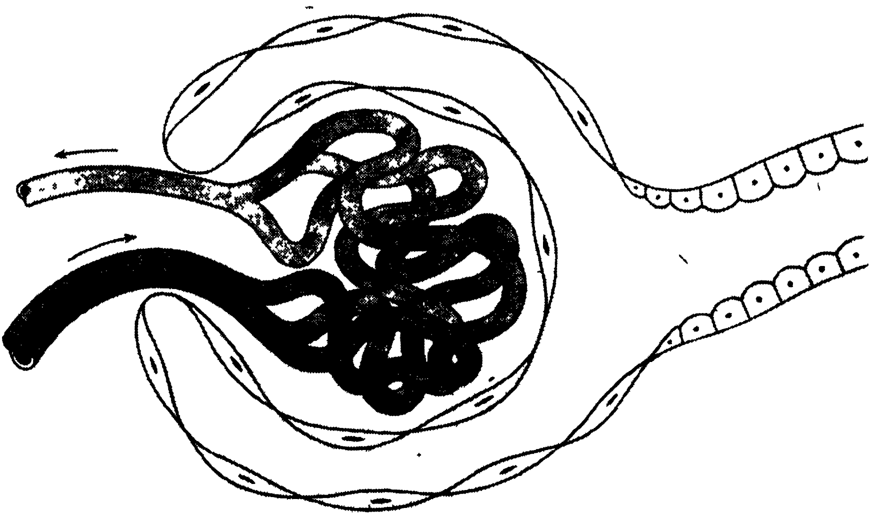


Fig. 2. *Diagram of a glomerulus (filter bud). The arrows pointing inwards and outwards which are seen on the left-hand side of the drawing, mark direction of blood flow.*

themselves, capable of doing harm in this way, so any person with kidney disease should not take any drug, even a purgative, without first asking his or her doctor's permission.

The act of passing urine is a voluntary one under the control of the brain. The newly born child passes water whenever its bladder becomes sufficiently distended. As it grows up it is educated by its parents to exert control, and only to pass water at certain times in the proper place. Usually a considerable degree of control is obtained in the first year of life.

HOW URINE IS PASSED

The mechanism of micturition can be best understood if we consider again the anatomy of the parts. Urine is passed fairly constantly down both ureters or muscle tubes from the kidneys into the bladder. Periodically the tube relaxes at the entrance into the bladder wall and allows a few teaspoonfuls of urine to pass on into the bladder. Now on reaching the bladder the ureters pass through the bladder wall obliquely, thus preventing the urine trickling back from the bladder. The bladder is a pear-shaped muscular storage tank, "clasping" its contents, and therefore enlarging (relaxing) or contracting depending on the volume of its contents. Its base is fixed on the bottom of the abdominal cavity, so that enlargement shows as a mass that can be felt, and sometimes seen, rising up into the lower part of the abdomen above the bony frame. Other masses very similar in shape may occupy the same area, for instance, the womb of a pregnant woman, but the bladder is the only mass that disappears or lessens markedly when the patient has to pass water.

The bladder receives its motor nerve supply from the spinal cord and also from a system called the sympathetic nervous system. Stimulation of the former set of nerves causes relaxation of the muscle ring, or sphincter, guarding the entrance into the urethra and it also causes the bladder to contract. These motor nerves cause the act of passing water. The way in which they act is described in Chapter VIII.

CONTROL THROUGH NERVES

Stimulation of the sympathetic nerves has the opposite effect—relaxation of the bladder wall and contraction of the sphincter, that is, it inhibits passing of water. When within the bladder a certain pressure is reached, the desire is felt to pass water, and, subject to the control of the mind, the former mechanism is set into motion; the sphincter relaxes, while the bladder contracts. If the time and place are not convenient, the latter mechanism is brought into play and the impulse forbidden until a later, or more convenient time presents itself. Damage or disease of the spinal cord, whence come these nerves, will therefore cause abnormal function—inability to micturate, loss of control (incontinence) or altered or weakened control (*see also* page 112).

URINE

Urine is the water which is passed out of the body via the urinary tract containing in it many waste products. It varies greatly in shade, but is usually of a straw or light orange colour. After much water or any other fluid has been taken, the colour of the urine becomes much lighter, and may even resemble water itself. If no fluid has been taken for several hours, especially if much fluid has been lost by other channels—sweating, vomiting or diarrhoea—the urine becomes more concentrated and darker in colour, and may be quite thick with an orange or brick red deposit on standing.

The normal person's output of urine per day varies with his intake, and is also affected by the amount of fluid lost by other channels. The more he drinks of any fluid the more urine he has to pass. The colder the weather the less he perspires, and therefore the more fluid passed as urine. The more fluid he loses by perspiration, vomiting or diarrhoea the less there is for the kidneys to excrete. The average daily output, taking all factors into consideration, is 50 fluid oz. (2½ pints). The amount taken as fluid during the day should be approximately equal to the amount of urine excreted by the kidneys.

SPECIAL TREATMENTS IN NURSING URINARY DISEASES

To collect a specimen of urine may, in the case of infants, require much patience. You must hold the child out over a clean urinal at intervals until you succeed. The urinal or whatever is used, should be as clean as possible, and if the specimen is to be sent to the laboratory for examination it should be cleaned very rigidly, as also must the container in which it is sent. Both urinal and container should be placed in cold water, brought to the boil and kept at boiling point for ten minutes. Any bottle used should be thoroughly cleaned out before it is boiled up, as small particles may adhere to the inner surface and contaminate the contents even after boiling.

CLEANLINESS IS ESSENTIAL

In the case of adults the early morning specimen is the best. On rising from bed the parts are thoroughly cleaned and if possible a bath should be taken. The specimen is passed, in the case of males, direct into the clean receptacle. In the case of females it is transferred from the chamber, which has previously been scalded out with hot water or cleaned with disinfectant and then rinsed with water, which has been boiled. The contents are then transferred to the bottle, which is labelled with the name of the patient and the time and date of collection. It should then be taken straight away to the doctor for examination, for it should be examined within a few hours of collection.

If an ordinary specimen is all that is required, that is, when organisms are not going to be looked for, it is enough to scald the bottle out with hot water, and in such cases it is not necessary to trouble about boiling.

Specimens should not be taken from women during their menstrual periods, or if there is much discharge from the vagina. In this case the ordinary specimen is not really satisfactory, and a catheter specimen is necessary.

USE OF A CATHETER

Sometimes it is necessary to take off urine, either because the patient is unable to pass water, or, in the case of women, for the reasons given above. If a patient is unable to pass water, one should first try the effect of heat over the lower part of the body. A hot-water bottle over the lower part of the abdomen will sometimes do the trick. If this fails, a hot bath is the last resort short of using a catheter. If a catheter must be used the actual procedure will have to be done by a trained nurse or a doctor. The home nurse's duties will consist in seeing that all is ready for the doctor. If you are asked to procure a catheter always get a rubber one. If you are asked to prepare things for the nurse or doctor, sterilize the catheter by boiling it for ten minutes in clean water. Then get ready some small pieces of cotton wool and boil them in a pint of water to which a teaspoonful of boracic powder has been added. Have ready also liquid paraffin for greasing the catheter.

SIMPLE EXAMINATION

You cannot tell just by looking at a specimen of urine whether there is anything abnormal in it or not, unless things are radically wrong. The dark brick colour of many specimens is not due to blood, as patients often think, but to salts (urates) which are of no significance. Three things, however, can, if present in large enough amounts, be detected on simple examination.

1. Dark red smoky urine, due to large amounts of blood.
2. The green or brown-yellow urine with a green haze on the surface, due to bile.
3. The urine containing pus in large amounts. This is smoky white, but may easily be confused with less serious conditions.

BLOOD AND BILE

1. The red, smoky urine is a sign of serious trouble and the home nurse should report it immediately to the doctor. Blood passed in the urine is altered in colour and freely mixed, so it has a dull red colour making the urine thicker than usual. If the blood has come from the urethra, or in some cases from the bladder, it will not have had time to have mixed freely with the urine and will show as streaks or clots of brighter red blood. True smoky urine means that bleeding has occurred from kidney, pelvis, ureter or occasionally the bladder.

2. The bile-stained urine is of darker colour than usual—a dull greeny-brown, and on looking at the surface of the fluid in a glass bottle a greenish sheen is seen. Bile pigment in the urine is always important as it means jaundice due to a gallstone obstruction of the bile duct or inflammation. In such cases the patient will be jaundiced, although the yellow colour may be only detected in the eyes. The whites of the eyes are the first parts to become coloured at the onset, and the last to become normal in convalescence.

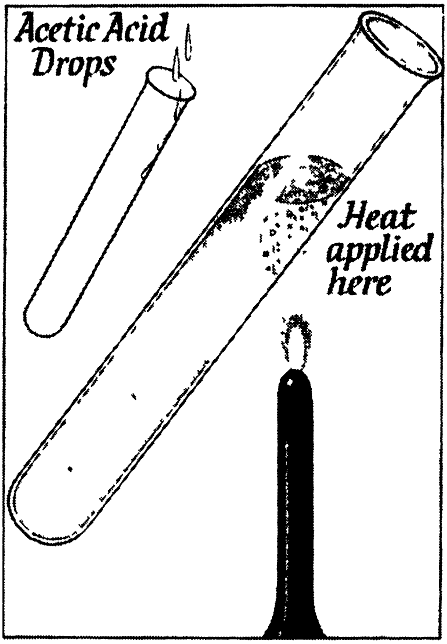


Fig. 3. *Diagram showing how to make a simple test for albumen (see page* 137).

PUS IN THE URINE

3. The thick, cloudy white deposit in urine may be caused by phosphates and mucus, which are harmless, but pus also gives this appearance and special tests will show which condition it is. Pus in the urine means that there is inflammation somewhere in the urinary tract, and it is therefore an important finding demanding treatment.

A few other abnormally coloured urines are occasionally met with. Hæmoglobin—the pigment of the blood—may be passed. This is not common, but should be reported to the doctor, as it is a sign of disease. After eating certain sweets containing aniline dyes the urine may become pink. Any pills, such as some backache pills, which contain methylene blue, give green or blue-green urine, but this is of no significance. Santonin—a drug taken to cure the patient of intestinal worms—may give a yellow colour, and rhubarb and senna may give an orange or reddish-brown urine.

To sum up, pus, blood or bile found in the urine are significant as they mean disease.

HARMLESS DEPOSITS

After normal urine has stood for a little while certain deposits settle down to the bottom of the glass, which are of no significance. These are:—

(*a*) *Urates.*—The salts of sodium, potassium and ammonium occur normally, giving a brick red deposit like brick dust. They are dissolved by heating some of the urine in a test tube. Strong acids such as nitric acid dissolve the deposit at once, making it froth.

(*b*) *Phosphates.*—The salts of calcium and magnesium settle out of a neutral or alkaline urine. They are colourless and resemble porcelain. They dissolve if dilute acetic acid be added to the urine.

(*c*) *Uric Acid.*—These show up as fine dark brown crystals resembling cayenne pepper.

(*d*) *Mucus.*—This, the commonest deposit, separates out some little while after the urine has been passed. It is a light, filmy cloud floating in the urine near the bottom of the glass.

With the exception of the three conditions mentioned previously (pus, bile and blood) there are few abnormalities that can be told by simple inspection of the urine, and special tests have to be performed. There are many such tests but the following are the more common and useful for the home nurse to know.

TEST FOR ALBUMEN

1. *Albumen.*—Albumen is a substance occurring naturally in the body, but it should not be present in the urine. If it is suspected the doctor may want the albumen test made. Fill a test tube three-quarters full and, holding it at the bottom, gently heat the fluid in the upper third over a spirit lamp or bunsen burner (*see* diagram). Heat it to boiling point without shaking the test tube and keep it at just below this point for a minute or so. A white cloud may appear in the urine at the site of heating. Add a few drops of dilute acetic acid. Persistence of the white cloud means albumen. If, on adding acetic acid, the cloud disappears then no albumen is present in the urine.

TEST FOR SUGAR

2. *Sugar.*—This may constantly occur in the urine of certain normal persons but it should always be reported as it usually means diabetes mellitus (sugar diabetes). Benedict's test for sugar is one of the best tests. Put 1 in. of Benedict's reagent (a solution of copper sulphate obtainable without prescription at a good chemist's) in the test tube, boil for a minute, then add six drops of urine. Boil for another minute, then stand the tube upright, allowing it to cool. If no sugar is present the solution remains blue. If a little sugar is present a green colour appears and a yellow-green deposit settles out. A moderately large amount of sugar (half to one per cent) gives a vivid yellow colour and deposit, over one per cent of sugar a brick red colour and deposit. In this way, then, not only can the presence of sugar in the urine

be detected but the approximate amount present is also indicated.

3. *Bile.*—This may be demonstrated by noting that after shaking up a little urine in the test tube the froth is a yellow colour instead of white. It is best to compare with a normal specimen to be certain. In the specimen in which bile is present, the froth persists longer than normally.

4. *Pus.*—Tests for this abnormality are not entirely satisfactory and it is best to have microscopical examination performed by your doctor. Small amounts of pus are discernible only in this manner as it needs gross amounts to give the smoky white appearance described above to the urine.

SYMPTOMS OF URINARY DISEASE

1. **Renal Colic.**—The patient experiences severe pain in one or other kidney region. (Kidney regions are the small of the back, each side of the lower part of the spine, just below the last rib.) This pain has the severe griping quality peculiar to all colics. It may indeed be so severe as to cause the patient to roll about on the bed in agony, pale and sweating. The pain tends to radiate round to the front of the abdomen, and down to the groin on the affected side, sometimes into the thigh. This colic may ease up for a while but will probably return until the stone or other cause of obstruction is passed or removed. The patient often feels nauseated and may actually vomit. There is a frequent desire to pass water and what is passed is scanty and may be blood-stained. Attacks of colic may last for anything from a few minutes to two hours or longer. Afterwards there is an aching and tenderness in the loin. During the attack the stomach muscles on the affected side may be rigid, and there is tenderness over the kidney.

Bladder colic is rather different in many ways. It is a very painful and severe bearing down sensation in the bladder, the pain often reaching to the point of the penis in men, or to the urethral opening in women. A stone in the bladder tends to cause such a pain when water has just been passed, when the bladder contracts down on the stone. There is frequency of passing water, and there are usually signs of infection in the urine, pus being present.

2. **Frequency of Passing Water.**—A normal person passes water every two to four hours or so during the day and only once, or not at all, at night. An increase of frequency at night may be an early symptom of kidney disease. Marked frequency with pain is common in cystitis (inflammation of the bladder) and may also be caused by inflammation of the pelvis of the kidney (pyelitis) or urethra (urethritis). A frequent cause in women is a mild cystitis associated with a small prolapse (dropping) of the womb and bladder, a condition not in itself dangerous but which may lead to much trouble if not reported to the doctor and properly treated. This prolapse tends to maintain infection in the bladder. A common cause of frequency in men over fifty years of age is an enlarged prostate gland. This gland is situated just below the bladder and the urethra through which the urine passes runs through its substance. Enlargement may therefore interfere with the flow.

NERVOUS FREQUENCY

Frequency may also be a symptom entirely due to nervousness; the candidate before an examination often has marked frequency, and during air raids nervous frequency is a common phenomenon. In addition certain people get into the habit of unnecessary frequency during the day, made worse by nervous stimuli.

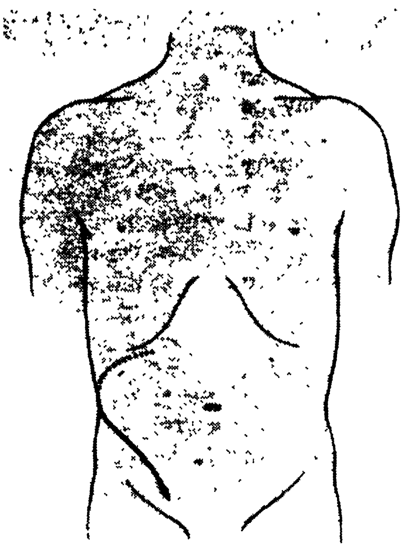


Fig. 4. *The track of renal colic.*

To summarize: Frequency may be (1) nervous in origin; (2) due to inflammation or irritation of part of the urinary tract—pelvis of kidney, bladder, urethra; (3) due to kidney disease, such as chronic nephritis; (4) due to partial obstruction of the urinary flow, as in a case with an enlarged prostate gland; (5) a combination of inflammation and obstruction, for infection occurs all the more readily if the urine cannot flow freely; (6) due to nervous disease. This is discussed elsewhere.

3. Straining—difficulty in passing water—may be caused by anything which interferes with the passage of water through the urethra, the commonest causes being prostatic enlargement (simple or due to a growth), a stricture (due to injury or inflammation of the urethra), a stone or merely nervousness. A tight foreskin in a male child or adult is hardly ever the cause of difficulty in passing water. Prolapse (mentioned above) may cause the symptom.

4. Pain on Passing Water.—The causes are largely those already mentioned—in the small child a tight, inflamed foreskin or an injury to the urethra. Sometimes small ulcers develop in the fold of skin running backwards from the urethral opening at the end of the penis (the frenum) and such frenal ulcers are painful when passing water. Sometimes the urethra becomes inflamed, causing the same symptom.

GONORRHŒA IN MALES

In the young adult acute inflammation causes severe pain "like passing red-hot fish-hooks" and this is usually due to gonorrhœa and is accompanied by a green purulent discharge from the urethra and pus in the urine. It is a condition needing urgent and thorough treatment at a clinic and cannot be treated at home. The discharge is contagious and not only causes spread of the disease to the opposite sex by direct contact, but also by indirect contact. An infected towel, for instance, may cause severe inflammation of the eyes if allowed to touch them. Other causes in young adults are simple inflammation (uncommon) and injury to the urethra.

In older people, from thirty years onwards, these conditions are somewhat less common, but gonorrhœa is still a likely cause. Apart from this cystitis (inflammation of the bladder) is a likely cause of pain on passing of water. It may be caused by several different kinds of bacteria, the commonest being bacillus coli. Diabetes occasionally causes frequency and slight pain.

5. Oliguria and Anuria.—By oliguria is meant the passing of only a little urine, much less than normal. It may be due to the fact that only little fluid has been taken for several hours or that much fluid has been lost by other channels, leaving little for the kidneys to deal with. Certain diseases also cause oliguria—acute nephritis in the early stage of the disease and chronic nephritis in the terminal stages. Sometimes the cause is an obstruction (for example, a stone) in one ureter or kidney pelvis and the other side also stops secreting, as if it were acting in sympathy.

Anuria is complete cessation of urine passing. It is merely a stage worse than oliguria and is due to the same causes.

6. **Polyuria** is an excess of urine, many pints being passed in the twenty-four hours. Apart from over-consumption of fluids of any kind the common conditions are sugar diabetes and certain phases of nephritis. More rarely it is a condition called diabetes insipidus due to the lack of function of the pituitary gland in the brain.

7. **Incontinence.**—The normal person after infancy is able to control the passing of water. This control may be less perfect in some unfortunate people; and this condition of incontinence of urine at night in such people is called nocturnal enuresis. It is a condition beyond the patient's control and one should not punish a child on account of bed-wetting.

In very severe illnesses, under partial anæsthesia, in extreme old age, or during a fit, control may be lost. Women after child-bearing also may have difficulty in controlling the escape of water. This is due to changes in the region of the bladder subsequent to the strain of labour, and not to nervous control. In certain nervous diseases control may be lessened, and strong nervous stimuli (such as gunfire) may cause temporary loss of control. After injuries to the spine, which affect the nerves, control may be lost.

8. **Oedema** (dropsy).—In certain diseases fluid appears in the tissues of the body having oozed out from the small blood vessels into the surrounding structures; certain diseases of the kidneys are accompanied by this complaint. In acute nephritis, for instance, puffiness or waterlogging round the eyes and in the ankles is seen, and in the later stages may become much more marked. When the fluid first begins to collect it may not be apparent to the eye, but the patient's weight will be found to have increased. It is important, therefore, if the patient is suspected of dropsy to weigh him periodically—once every few days; a man whose weight normally remains very constant and who has kidney disease may begin to put on weight for some days before dropsy appears.

Dropsy of nephritis differs from other types in that it tends to start in the loose tissues where the skin is loose and not fastened down to the underlying structures, for example, round the eyes. It must be remembered that there are several other causes of dropsy, apart from kidney disease. These are heart disease, severe anæmia, famine and certain other illnesses.

PART II: *CHAPTER I*

NURSING OF INFECTIOUS DISEASES

by G. H. NEWNS, M.D., M.R.C.P.

(*See also Part I. Chapter III. Nursing a Case of Fever*)

MANY diseases are infectious or contagious, for example, measles and whooping cough. These diseases are caught, either directly or indirectly, from people suffering from them. They are caused by germs, which pass from person to person, generally in the breath. The germs, however, may get on to clothing, toys, etc., which the patient has touched, and anybody who handles these things may catch the disease. Two diseases which may be spread by this method are smallpox and diphtheria.

HOW INFECTION IS SPREAD

Infectious diseases may be spread by carriers, that is, people who are not suffering from the disease but harbour the germ in their throats and so may give it to any one who comes in contact with them. Scarlet fever and diphtheria carriers are common, and many cases of these two diseases are caused by them.

Milk and water may be sources of infection. By some means or other, generally from a carrier, they are contaminated by the germs, and anybody who drinks the infected milk or water is liable to catch the disease. Typhoid fever, scarlet fever and diphtheria may all be spread by this method. It is very important, therefore, that milk should be boiled or pasteurized to kill any germs. Great care is always taken to prevent the water supply from being contaminated with any of these germs.

Infectious diseases are accompanied by fever. In most of them there is a characteristic rash by which the disease may be recognized. A varying period elapses between the day when the patient actually catches the disease and the appearance of the first symptom. This is known as the incubation period. The length of this varies with each disease. There is also very often an interval between the first symptom and the appearance of the rash. During most of the incubation period, the patient is not infectious.

Epidemics of infectious diseases often break out; for some reason or other large numbers of cases occur for a time. Then the disease gradually dies out. Epidemics of measles, for instance, occur every two years. Sometimes a disease will break out over the whole world as did the great influenza epidemic in 1917.

TOXINS

How does the body deal with the germ causing the infection? Germs produce poisons, or toxins. It is these which cause the symptoms of the disease. The body tries to cure itself by producing an antidote, or antitoxin which circulates in the blood and neutralizes the poison. If it is successful the patient recovers. Sometimes the poison

Do not inflate an air ring too much—if it's hard it's not comfortable for the patient—and always encase it in a pillow slip.

is too powerful and the patient dies. It is a well-known fact that people who have once had an infectious disease seldom catch it a second time. The reason is that some of the antidote remains in the blood after recovery, very often for the rest of the patient's life, and tends to prevent him from catching the disease again.

ANTITOXINS

The body can be assisted in its efforts to neutralize the poison. It is possible to make an antidote (antitoxin) and inject it into the individual. This is done in the case of diphtheria, and diphtheria antitoxin has saved many lives. Another method is to stimulate the body to make more antitoxin. This is done by means of vaccines, as in the prevention of smallpox, diphtheria, typhoid fever, etc. One or several injections are given, the result being that so much antidote is made by the body that the germ is rendered harmless, and the individual does not catch the disease even when he is exposed to infection. This method is of chief value in the prevention of disease. Its effect lasts for several years, and sometimes for the rest of the individual's life.

When a case of infectious disease has occurred, it may be prevented from spreading by the following precautions:—

1. Isolation of the patient in a room in his own home or in a fever hospital. He is then unable to spread the disease to other people.

2. Isolation of contacts; that is, persons who have been near to the patient at the time or shortly before he developed the disease, for example, his schoolfellows or members of his family. Isolation of contacts is generally known as quarantining. The quarantine period is the time during which isolation is necessary. It varies with the individual disease, for it is equal to the longest possible incubation period for the disease. In the case of scarlet fever, for instance, a person may develop symptoms up to a week from the time when he was last exposed to infection but not after, because the longest incubation period for scarlet fever is a week. All contacts must therefore be quarantined for a week. The idea of quarantining is to remove out of circulation, as it were, all persons who might develop the disease, and so prevent it from spreading.

DISINFECTION

3. Disinfection. The patient's clothes, toys, books or other articles he may have touched, as well as the furniture, etc., are disinfected, usually by fumigation. This kills the germs, and so any one touching these articles afterwards will not catch the disease.

4. Disinfection of the discharges of the patient, e.g., the stools, urine and discharges from the nose and ear. This is very important in typhoid fever, scarlet fever and diphtheria.

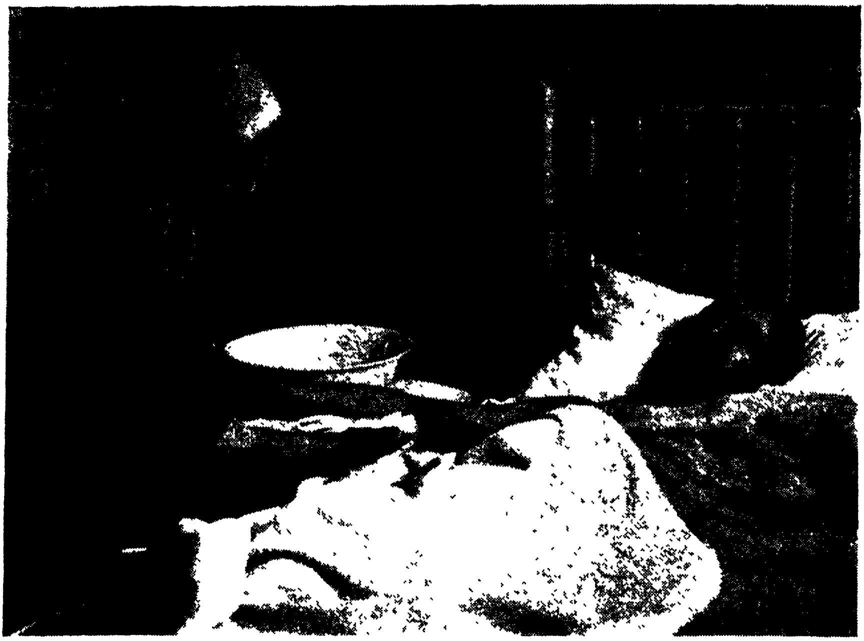
5. The injection of contacts with

antitoxin. In some diseases, for instance, scarlet fever and diphtheria, it is possible, by injecting small doses of antitoxin soon after a person has been exposed to infection, to prevent the disease from developing. As soon as the germ makes poison in the blood it is neutralized by the antitoxin which has been injected, and in consequence the individual never develops any symptoms of the disease.

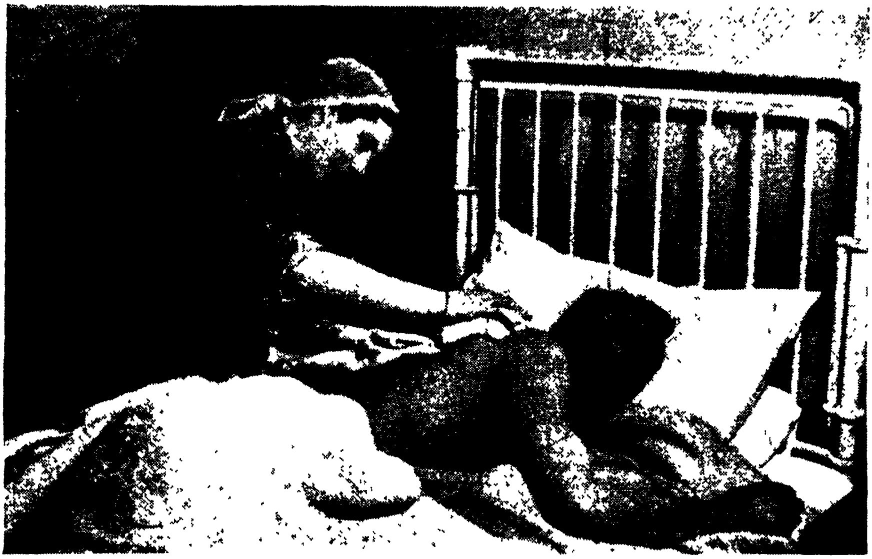
Whether a patient with an infectious disease is nursed at home or in hospital depends largely on the disease. The more serious cases, such as diphtheria and smallpox, should be sent to hospital. The milder ones, such as measles, mumps or chicken-pox, can usually be nursed safely at home.

A room in the house should be set apart, preferably (in normal times) at the top of the house. It should be airy and light. A wash basin with running water is an advantage. An open fireplace is the best method of heating since it is also an aid to ventilation, and it can be used to burn soiled swabs, etc. All carpets, hangings, upholstery and unnecessary furniture and ornaments should be removed. Plain washable furniture is the best type. The old-fashioned curtain outside the door is not necessary, but by the door should be placed a bath containing disinfectant (1 tablespoonful to each pint of water), in which soiled linen should be placed directly it is taken from the patient. After it has been soaked in this for six

Inserting an air ring into the bed. Ordinarily, of course, the patient should be covered by bed-clothes. Unless he is helpless, he should be able to help by raising himself a little, but always the nurse should give him some support while a second person slips the encased ring under his buttocks as shown in the photograph above.



Blanket Bathing (I). *If a patient is too ill to go to the bathroom, he must be blanket bathed. He should lie on a blanket, with only a blanket covering him. Begin by washing his face, neck and ears gently with a soft flannel; then one arm at a time as illustrated.*



Blanket Bathing (III). *Roll the patient over gently and wash his back. When you are blanket bathing be sure you have everything you need. It is important that the patient does not get chilled, but he will if you go to and fro fetching things you have forgotten.*

Blanket Bathing (II). *Now pull down the blanket and wash the chest as shown Always remember that two towels should be used One is spread on the bed to protect the blanket as shown The other is used to dry the skin Do not allow the patient to make any effort*

Blanket Bathing (IV). *Lastly, you wash the legs, one at a time, as shown The final point to remember is to dry the patient—gently but properly. A damp skin chafes and is most uncomfortable As each part is finished you can dust over a little talcum powder.*

hours it may be sent to the laundry. The patient's cooking and eating utensils should be set apart and marked, so that no one else uses them.

Inside the room, on a table, a small bowl of disinfectant should be placed. In this, the hands are rinsed after attending to the patient and before being washed. The nurse should wear a gown while seeing to the patient. This should be left hanging outside the door, to be put on again as soon as she goes into the room.

When the patient has recovered he should have a bath and put on clean clothes. His old clothes should be fumigated together with the room and its contents.

Measles.—Measles is a very infectious disease, spread by contact with the patient. Though the disease itself is not serious, broncho-pneumonia may develop as a complication. It is usual to have an epidemic of measles every second year.

The incubation period is ten to fourteen days. Apart from some slight catarrh and fever at the beginning of this period, the patient keeps well. The disease starts with severe catarrh of the nose, throat and eyes. The patient has a cough, shivering fits, often a hoarse voice, and there is a watery discharge from the eyes. The temperature is raised at first. It is during this period that the disease is most infectious. Soon after the appearance of these symptoms small bluish-white spots with a red margin may be seen inside the mouth over the middle of the cheek. These are called Koplik's spots and are definite evidence of measles.

Shortly before the appearance of the rash the temperature falls and the symptoms improve. The rash begins to appear on the fourth day after the beginning of the catarrhal symptoms. It is first seen behind the ears and around the mouth. It spreads to the chest and later to the whole body, taking two to three days to spread. It consists first of small raised pink spots but it later develops into blotchy red patches giving rise to a "lobster" appearance. The rash, after three to four days, fades quickly, leaving a brownish stain which is followed by a fine scaling of the skin. While the rash is at its height the temperature is high, the face and eyes become swollen and the throat sore. There is a cough, and a watery discharge from the eyes. These symptoms rapidly disappear when the rash fades. The most serious complication is broncho-pneumonia, but with careful nursing the danger of this occurring is much reduced. Laryngitis and inflammation of the eyelids and eyes are common.

TREATMENT IN MEASLES

The patient should be isolated in bed in a warm, well ventilated room. The diet should consist of milk, beef tea, custard, jellies, etc., and also fruit drinks, such as orangeade and lemonade, and water. The care of the eyes and mouth is important. The eyes should be washed out once or twice a day with boracic lotion. At night a little vaseline rubbed on the lids will prevent their sticking together, and will make the morning eye-wash easier. If they become much inflamed they should be protected from strong light by eye shades, and by keeping the curtains drawn. The mouth should be swabbed out every four hours with a piece of lint which has been dipped in glycerine of borax.

If there is laryngitis, much relief may be obtained by the use of a steam tent and bronchitis kettle (*see* pages 117 and 121). This should be discontinued when the cough is loose. If the temperature rises to over 103 to 104 degrees, tepid sponging may be carried out (*see* page 45). In any case the patient should have a warm blanket-bath daily (*see* pages 44 and 144-145). Should bronchopneumonia occur, it is wisest to have the patient removed to hospital. (For pneumonia *see* Part II, CHAPTER VIII).

The danger of infection is in the first two weeks after the appearance of the rash. The quarantine period lasts for three weeks.

Prevention of Measles.—Persons who have had measles are generally not liable to get further attacks, for their blood contains antitoxins (*see* page 141) which last for many years. By injecting some of the serum (the clear part of the blood) from a patient who has recently recovered from measles, into someone who has been exposed to infection, the disease may be prevented from appearing. This is of great value in the case of young infants and weakly children, in whom measles may be a serious disease.

German Measles.—This is a very much milder disease than measles, and is much less infectious. It is spread directly from patient to patient. The incubation period is about fourteen days. The rash appears right at the beginning of the disease and is usually the first symptom of illness. There is a slight temperature and the patient generally feels a little ill. The rash starts on the face and scalp, and soon after spreads to the body and limbs. It consists of small red spots which can be felt when the fingers are passed over them. Later the spots tend to run together and form a general flush over the body. The rash lasts two or three days and then rapidly disappears. There is always enlargement of the glands behind the ears, at the back of the head and in the upper part of the neck. They feel like little hard lumps beneath the skin. There are no serious complications of German measles.

The patient should be kept in bed until the rash has gone and the temperature has become normal. A light diet should be given. The patient should be isolated for seven days from the appearance of the rash. The quarantine period is twenty-one days.

Chicken-pox.—This is generally a mild disease. It is highly infectious and is caught directly from the patient. The incubation period varies from ten to twenty-one days. The rash is the first sign of the disease. At the same time there is a slight rise of temperature and the patient feels slightly ill. The rash makes its first appearance on the body, spreading in a day or two to the face and limbs. It is most prominent on the body and in the groins and armpits. For some days there are successive crops of the rash, every two or three days. The rash starts as small pink spots which soon become filled with clear fluid. They look rather like tiny drops of water on the skin. After a day or two they burst, and a yellowish-brown scab forms which separates after a time, leaving a pinkish stain. The larger pocks may become full of pus. These usually leave a small scar. The spots also occur inside the mouth, and form a small greyish-white ulcer. The rash is irritating and often gives rise to scratching, and as a result infection of the spots may occur. The usual time from the appearance of the rash until the shedding of the spots is about a fortnight. Complications are very rare.

TREATMENT IN CHICKEN-POX

The patient should be kept in bed until the rash is fading. The spots should be dusted with a dusting powder, e.g., starch and zinc. If they become inflamed they may be treated with boric acid fomentations (*see* page 214). The itching is relieved by warm alkaline baths (e.g., sodium bicarbonate). It may be necessary to fix the arms in light cardboard splints to prevent scratching. If there is a big rash on the scalp the hair should be cut short.

The patient should be isolated until the last scab has separated. The quarantine period is three weeks.

Smallpox.—This is a very much more serious disease than chicken-pox. It may be caught directly from a patient, or by touching objects, e.g., clothing or toys which have been in contact with the patient. The incubation period is about twelve days. The disease starts suddenly with pain in the head, back and limbs, vomiting and high fever. In severe cases delirium and convulsions may occur. The rash appears on the third day of the illness, first on the forehead, temples and wrists. It rapidly spreads over the whole body but tends to affect the legs, arms and face more than the body. It starts as small red specks. These increase in size and develop into little shotty bodies in the skin. After a few days they become filled with clear fluid. Soon the clear fluid turns to pus. In the second to fourth weeks of the illness the scabs separate, leaving scars.

The rash also occurs on the inside of the mouth and on the palate, producing discharging ulcers. On the face, in severe cases, the rash runs together. This is the type known as confluent smallpox, and is a very serious form. When the scabs begin to separate the temperature falls and the patient's condition slowly improves.

Some of the complications are laryngitis, bronchitis, broncho-pneumonia and inflammation of the eyes.

Nowadays, owing to vaccination, smallpox is a relatively mild disease. If there is any widespread relaxation of vaccination, the disease may possibly take on its previous deadly character.

Cases of smallpox must be sent into a special hospital. All those who have been in any way in contact with the case must be vaccinated, even if they have previously been vaccinated. Vaccination done soon after exposure to infection will prevent them from contracting the disease.

A fluid diet should be given. Tepid sponging or warm alkaline baths relieve the skin irritation. The face should be covered with a lint mask, soaked in glycerine. Crusts and scabs may be removed by means of boracic fomentations. The eyes must be bathed frequently with boracic lotion and the mouth swabbed with glycerine of borax.

Patients must be isolated until all the scabs are separated. All contacts should be quarantined for sixteen days. There should be a thorough disinfection of rooms and clothing.

Vaccination.—Vaccination was introduced over one hundred years ago by Dr. Jenner. It had been observed that dairy people who had contracted cowpox (a disease of the udders of cows) never developed smallpox. It is now known that cowpox is a similar disease to smallpox, but it differs from it, however, in that it is not infectious and it never produces smallpox. Any one, therefore, who has had cowpox does not catch smallpox. Vaccination consists in giving the person cowpox. (The scientific name is Vaccinia—hence the term vaccination.) Today this is done by inoculating into the skin specially prepared lymph from calves who have been given cowpox. This is done by making a scratch on the skin and rubbing in the lymph. Spots appear after a few days (rather like chicken-pox) where the inoculation has been made. These dry and form scabs, which leave a scar when they drop off (the vaccination mark). The patient may feel slightly ill for a day or two after the vaccination.

Infants should be vaccinated before the age of six months, providing they are healthy. The effects wear off after a few years, so that it is advisable to repeat the vaccination at about ten years of age. This usually lasts for the rest of the patient's life.

There is no doubt that vaccination has stamped out smallpox, which used to be one of the commonest infectious diseases. The danger today is that with so many people unvaccinated, it may break out again and become the scourge that it was before.

Scarlet Fever.—This infectious fever is caused by a germ called the streptococcus. It is spread usually by contact with a patient, but sometimes from a carrier (*see* page 141), and occasionally from infected milk.

The incubation period is two to five days, and the earliest symptoms are headache, sickness and sore throat. The temperature is high, the skin is hot and dry and the cheeks flushed. The pulse is very rapid. The back of the throat and the tonsils become very red, but there is no membrane as in diphtheria. The tongue at first is covered with white fur. Later the fur separates in patches, making it look rather like a strawberry.

The rash appears one to two days after the beginning of the disease, at first round the root of the neck and on the upper part of the chest, whence it spreads rapidly to the trunk and limbs. The palms and soles and the face are not affected. The rash is a pinkish-red colour, and on looking closely at it, tiny red spots can be seen. It lasts for several days (up to a week) and then fades. As it does so the symptoms become less pronounced.

Peeling starts just as the rash fades, beginning over the upper part of the chest and affecting the palms and soles last of all. The flakes are large and may be ring-like. Peeling lasts from four to six weeks.

Nowadays scarlet fever is a mild disease. The chief complications are a form of rheumatism affecting the joints, inflammation of the ear and kidney disease (nephritis).

TREATMENT IN SCARLET FEVER

Scarlet fever may be nursed at home, but on the whole it is better to send the patient to hospital. He should be isolated, confined to bed and given a light, nourishing diet. In the first two or three days only fluids are given. If his temperature is high, a tepid sponge may be necessary. If the throat is very sore, ice or, better still, some ice cream may be given. The mouth should be washed out frequently. M. & B. 693 and scarlatinal antitoxin are given in severe cases. The patient should be kept in bed for three or four weeks, unless complications set in. Isolation should last six weeks. If, however, there is ear discharge, isolation should be continued until it has cleared up, as the discharge may be very infectious. Such patients often act as carriers. Contacts should be quarantined for ten days.

By a special skin test it is possible to tell whether a child is liable to develop scarlet fever. If the test is positive he may be immunized against scarlet fever by means of two to three injections under the skin. These are harmless and cause no bad effects. By this means the child can be protected from infection for several years.

Erysipelas.—This disease (blood poisoning of the skin) is caused by a streptococcus, similar to the one causing scarlet fever. This germ gets into the skin through a cut or abrasion and causes the skin to swell and become very red and tender. The inflammation spreads very rapidly and the swelling may be very great. The temperature is high (104 to 105 degrees) and the patient may become extremely ill. After one to two weeks the swelling goes down and the patient recovers. The disease may be a serious one, especially in children and old people.

The patient should be isolated and put to bed. A very nourishing diet is essential. The doctor will prescribe ointments and lotions to be applied to the inflamed area. Streptococcal antitoxin should be given. The new drug prontosil, however, has a dramatic effect, curing the patient within a few days in most cases.

Diphtheria.—Diphtheria is caused by a germ called the diphtheria bacillus. It is spread by direct contact with a patient, or with a carrier (*see* page 141). Occasionally contaminated milk is the source of infection. There is no adequate evidence that it is caused by defective drainage.

The incubation period is two to four days. Diphtheria affects the throat, nose and windpipe. There is a rise of temperature and the patient has a headache and feels ill. There are pains in the limbs and he may be sick. In the throat and on the tonsils a membrane is formed which is greyish-white in colour. This may spread all over the back of the throat. The glands on either side of the neck become much enlarged. In a few days the membrane begins to grow smaller and eventually shrinks and disappears. In the severe forms of the disease the membrane remains, and the patient becomes gravely ill. The membrane may extend down into the windpipe. The patient becomes hoarse and has a barking cough, his breathing becomes more and more difficult and sometimes an operation on the throat is necessary. The nose type of diphtheria is usually mild. There is a bloodstained discharge from the nose, due to a membrane which forms inside.

Two serious complications may occur. There may be heart failure as a result of the action of the poison on the heart, or paralysis may develop. This affects the throat first, so that swallowing is difficult. The patient has a nasal voice, and fluids, when drunk, may come back through the nose. Later on the limbs may become paralysed. After some time the paralysis gets better and eventually disappears.

It is very important that the disease is recognized early, as by effective and early treatment, the patient can be cured. The doctor should always be called in whenever a child has a sore throat and, if necessary, a swab should be taken.

TREATMENT IN DIPHTHERIA

A patient with diphtheria should be treated in hospital. One of the main points about treatment is complete rest flat on the back with not more than one pillow. He is fed, and washed, and the bowels are regulated, if necessary, by enemas. The object of this is to rest the heart. After two to three weeks the patient is gradually allowed to sit up, providing the heart is not affected.

Diphtheria antitoxin (*see* page 142) must be injected as soon as possible. The earlier it is given the more chance there is of the patient being cured. The treatment with antitoxin has reduced the deaths from diphtheria to a very low level. A diphtheria patient should remain in isolation until three swabs from the throat are negative. The quarantine period is twelve days.

Diphtheria Immunization.—As with scarlet fever, it is possible to tell by a simple skin test whether a patient is liable to develop diphtheria. If the test is positive the patient should be given two or three injections under the skin. This is painless and produces no ill effects. It is wise to have children inoculated before they are two years old. There is a special clinic for this purpose in most districts. All parents should avail themselves of this opportunity. Experience in Canada and America shows that if all children are immunized, diphtheria almost disappears from the community. The protection given by immunization lasts from five to seven years, so that a child should have more injections when he is nine or ten years old. This second immunization should last for the rest of the individual's lifetime.

Whooping Cough. — Whooping cough is a very common disease. Although it is in most cases mild, in young children it may be serious owing to the occurrence of broncho-pneumonia. It is extremely infectious and is spread by direct contact.

The incubation period is about fourteen days. The disease starts gradually, with cough and fever. The cough is worse at night and tends to occur in spasms which are often followed by vomiting. This is the catarrhal stage, which lasts about ten to fourteen days. At the end of this period the whoop appears. The child gives ten to fifteen short coughs, during which the face turns purple, the veins stand out and the eyeballs bulge. Suddenly, a long crowing breath is taken. This is the whoop. It is usually followed by vomiting. Many of these attacks may occur every day. In infants the whoop may not occur. The whooping stage generally lasts for three to four weeks, but in some cases may last for two to three months. Broncho-pneumonia is the most serious complication, and may be fatal.

It is generally not necessary to send the child into hospital, and he may be nursed at home. He should be isolated, but after the fever has subsided it is not necessary to keep him in bed; in fact, the more fresh air he gets the better. In fine weather he may be allowed to go out of doors for short periods.

TREATMENT IN WHOOPING COUGH

The patient should have a light, easily digestible diet. Cod liver oil and malt should be given. The doctor will prescribe certain medicines which will help to relieve the attacks of coughing. Convalescence at the seaside is desirable. Vaccines are of little use in the treatment of the disease but they are of considerable value in preventing the disease in children who have been exposed to infection. The doctor should be consulted about these. A case of whooping cough should be isolated for six weeks. The quarantine period is three weeks.

Mumps.—This is a disease mainly of older children and is spread from one to another. The incubation period is eighteen to twenty-six days.

Mumps is a disease of the parotid gland, which is situated in front of and below the ear. The gland swells, usually one side at first. There is considerable pain, and difficulty in opening the mouth. There is a temperature (100 to 102 degrees) and the patient feels unwell. A day or two later the gland on the other side enlarges, but sometimes only one side is affected. After a week or so the glands become smaller and the temperature falls. The patient should be kept in bed while the glands are enlarged and given a semi-fluid diet.

Acids, such as lemons or even oranges, should not be given at first, for they stimulate the glands and make them even more painful. The patient will generally find semi-solids, such as custard, jelly or milk pudding, easier to swallow than plain fluids. However, the provision of drinking straws will encourage him to drink more than he would do otherwise. The mouth should be kept clean by antiseptic gargles.

The patient should be isolated for one week after the glandular swelling has subsided. The quarantine period is four weeks.

Typhoid Fever.—This disease is caused by a germ, the typhoid bacillus, which is contracted by eating infected food, or by means of contamination of the hands by the excretions or soiled linen of a patient suffering from the disease. The water or milk supply may become infected from a carrier (*see* page 141), for example, a cook or dairymaid. Watercress and other vegetables may be contaminated by infected sewage and may spread the disease.

SYMPTOMS IN TYPHOID

The incubation period is about fourteen days. The patient has headache, abdominal pain and is frequently sick. The appetite is lost and there is often a severe pain in the back. The temperature rises by steps to 103 or 104 degrees. The tongue is dry and coated and the belly is enlarged and tender. After a few days diarrhoea sets in, the stools being loose, watery and green (pea soup stools). In many cases a rash appears about the tenth to twelfth day of the disease. It consists of pink spots, mostly on the belly, chest and back. They fade after two or three days.

The symptoms increase, and during the second and third weeks restlessness and delirium set in. The stools increase in number, and the lips and tongue become very dry. It is at this stage that the serious complications of perforation of the bowel and internal hæmorrhage may occur. In the fourth week the patient begins to improve, the symptoms gradually disappearing. Relapses, however, sometimes occur.

Patients with typhoid fever are generally sent to hospital, as very skilled nursing is required. The patient must remain in bed for six or eight weeks. Strict precautions must be taken to disinfect all discharges, linen, etc. A special overall is used which should hang near the bed and be put on whenever the patient is touched. A bowl of lotion containing one per cent disinfectant is placed near the bed. After attending to the patient the nurse must wash her hands, after disinfecting them in the bowl.

All the feeding utensils, bed-pans, etc., must be specially set aside for the patient. All discharges, stools, urine, spittle, vomits, should be placed in a receptacle filled with two per cent disinfectant and left for six hours before being emptied down the lavatory. Water used in washing the patient should be treated in the same way. Soiled linen, bed-clothes, swabs, etc., should be soaked for six hours in a bin containing two per cent disinfectant (1 tablespoonful to a pint of water).

The patient is given a semi-solid diet. Special care has to be taken of the back to prevent bed-sores. The mouth must be washed out frequently. High temperatures must be treated by tepid sponging (*see* pages 45 and 144-145)

If hæmorrhage occurs the patient must be kept absolutely quiet. Ice may be given to suck and an ice bag should be applied to the abdomen. Perforation of the intestine requires immediate operation. As the patient improves the diet is increased. Convalescence must be prolonged. Isolation is necessary until the urine and stools have been negative on three successive occasions. Contacts should be isolated for three weeks.

Paratyphoid fever is a similar

disease to typhoid, and is caused by a similar germ. There are two forms, paratyphoid A and B. Both are very much milder than typhoid. The illness is shorter and serious complications are exceptional.

Typhoid fever may be prevented by vaccination with a typhoid vaccine.

Influenza.—This is an infectious disease caused by a small germ, the influenza bacillus. It is spread by contact with a patient. The disease frequently occurs in epidemics and is sometimes, as in 1917-18, world wide, when it is liable to be very severe. Usually it is a mild disease, occurring in the winter months of the year. The onset is sudden, with severe pains in the limbs and back. The temperature rises to 103—104 degrees and the patient may have a shivery attack, sickness, and pain in the stomach (gastric influenza) often occurs. The infection may extend to the chest causing bronchitis, or to the ear.

Usually the fever lasts for a few days and then subsides, the symptoms gradually disappearing. For some time afterwards the patient may feel mentally depressed, or extremely weak. The most serious complication is broncho-pneumonia.

The patient should be isolated, though he is only infectious at the beginning of the illness. The diet should be a fluid one until the temperature has fallen, when a nourishing diet should be given. The bowels should be kept well open. Tepid sponging may be necessary if the temperature is high.

CHAPTER II

COMMON AILMENTS OF CHILDREN

by G. H. NEWNS, M.D., M.R.C.P.

(*See also Part I. Chapter VI. Management of Infants and Children*)

THE small upsets of babies and children are among the most worrying things with which the mother and nurse must deal. Children, especially babies, are sometimes particularly distressing to cope with because they cannot help themselves, and cannot even tell the mother what they feel. Because of this, it is very necessary that you should notice carefully all the symptoms and manifestations of any illness in a child, both so that you can report accurately to your doctor, and also that you may know yourself exactly how to deal with the child.

Constipation in Infancy.—The normal stools in a breast-fed infant are from three to four a day in number, soft in consistency and bright yellow in colour. The stools of a bottle-fed baby are fewer in number, firmer and paler in colour.

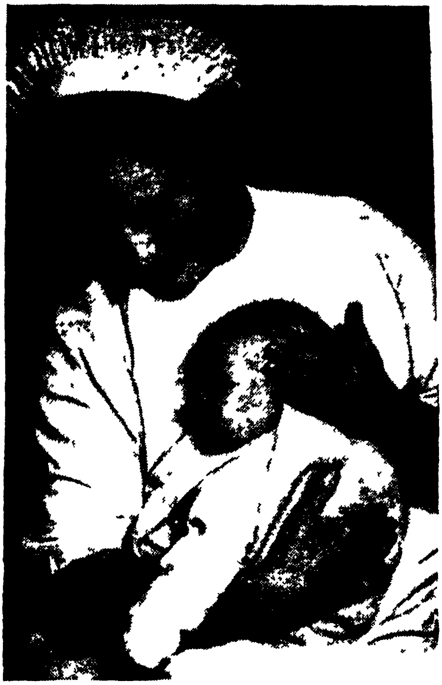
Causes of constipation in infancy are: insufficient fluid, feebleness of the muscles (such as occurs in the flabby, overweight infant) and incorrect management of the child. To correct constipation, see that the baby gets plenty of fluids (*see* Part I, CHAPTER VI, pages 81 to 86), and let him have drinks of boiled water between his feeds. Feeds should be given strictly to time, for it is most important to get the baby into regular habits, and over-feeding must be avoided. A little fruit juice daily—orange, tomato or prune juice—will have a laxative effect, and with bottle-fed babies a little sugar added to the milk is helpful. The baby should be "held out" at a certain time every day to encourage him to have a regular daily motion. The mother should place a small, warmed chamber on her lap and hold the baby on it in a comfortable sitting position; if she perseveres with this for a few days the baby will soon acquire the habit. These simple measures usually suffice to correct the baby's constipation, but if a mild aperient is necessary, a preparation of magnesia, a teaspoonful night and morning, or, failing this, a good liquid paraffin preparation may be given.

The method of holding a baby while he is being bottle fed. He should be able to swallow easily without choking.

Constipation in Older Children is often due to improper training in infancy and should be corrected as soon as possible. Again, regular habits are most important. Meals should be served regularly, with no snacks between, and the child should be sent to the w.c. daily at the same time (preferably just after his breakfast) to encourage him to form a habit. Give the child plenty of water between meals, and also a glass of water first thing in the morning before breakfast. The diet should contain cereals, such as oatmeal, whole wheat preparations, rice, etc., plenty of fruit and green vegetables, and wholemeal bread in place of white. These foods stimulate the bowel to normal action. In addition, the child should have exercise in the open air, and in special cases may need special exercises for the abdominal muscles. Usually fresh air, exercise, a regular life and the correct diet will cure constipation in the child; but if aperients are necessary the best kind is some form of liquid paraffin. This softens the contents of the bowel and lubricates it, helping the food to pass on. The paraffin can be given once or twice a day according to the child's needs at first, and gradually left off as the constipation is relieved and normal movements restored.

Diarrhoea in infancy must always be looked upon as a serious complaint and the doctor should be called in immediately. The trouble can be put right if it is treated at once, but the baby may become seriously ill if the condition is neglected. Diarrhoea may be caused by a faulty diet or overfeeding, or it may be caused by a germ conveyed by contaminated food, such as milk. This kind of diarrhoea is more serious; it is much commoner in hot weather.

In the diarrhoea resulting from

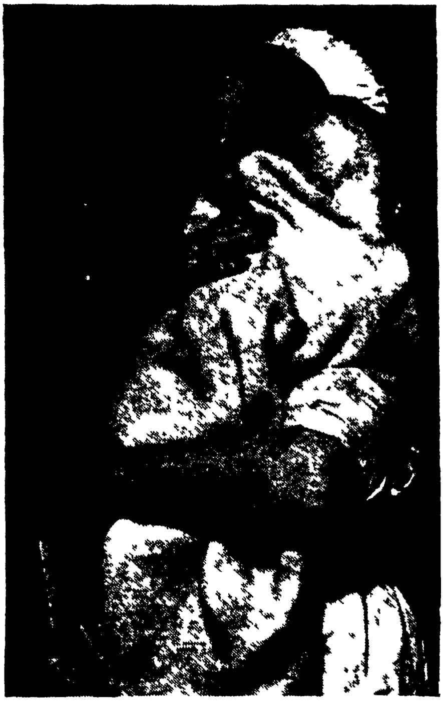


After being fed, a baby must always bring up his wind. Seat the child on your lap and support his head as shown in the photograph.

wrong diet the stools become more frequent, loose, green in colour and may contain curds. The buttocks often become red from the constant passage of fæces, and this adds to the baby's discomfort. He should be carefully washed, dried and powdered after each bowel movement. The soiled napkins, or other garments, should be kept well apart from other soiled laundry (especially where there are other small children) and should be thoroughly washed, and if possible boiled. The mother should wash her hands very carefully after attending to the baby's toilet. Colic and vomiting are usually present and the baby loses weight.

Treatment consists in correcting the diet, especially reducing the amount of fat and sugar, and, if there has been over-feeding, diminishing the total quantity of food. In the more severe cases it may be necessary to give for a time one of the more digestible milk mixtures, such as peptonized or lactic acid milk (*see* page 86). The doctor will, of course, decide about this and also the giving of medicine to correct the diarrhoea and relieve the colic. The infective type of diarrhoea is more sudden and acute and the vomiting is generally severe. The baby loses weight rapidly and may become very ill. The doctor should be called at once.

To prevent diarrhoea, care must be taken not to overfeed the child and not to give too much fat or sugar, as these are difficult to digest. Everything to do with the child's food must be scrupulously clean. Bottles, teats, etc., must be washed very thoroughly and kept covered between feeds. The milk



The other method of holding a baby while he brings up wind is shown above. The child is supported against the shoulder.

should be boiled and protected from flies and dust, especially in summer.

Vomiting in children may be due to a variety of causes, as follows:—

(*a*) *Gastritis.*—Vomiting may be caused by gastritis, or inflammation of the stomach lining, due to infection by a germ, when it is usually accompanied by diarrhoea. The baby may vomit everything, even water. The treatment consists in giving very small feeds, one or two ounces, of barley or glucose water (*see* page 86 for directions) every two or three hours. When the child is able to retain this small amount it can be increased gradually, later diluted milk feeds may be given. If the vomiting is very severe the doctor may order stomach washouts to be given daily for a period.

(*b*) *Indigestion.*—Sometimes vomiting is caused by indigestion, due to wrong diet, but often with babies it is simply the rejection of excess food. Another reason is when the baby swallows too much air. A baby normally sucks in some air with his milk, and that is why it is so important to hold him up after his feed—or during it if he seems uncomfortable—to let him bring up the air bubble. If he is very hungry or has to strain to get his meal from an empty breast or a bottle teat with too small an opening, he swallows too much air. Then if he is put down to sleep straight after his meal, this will cause pain and trouble. The baby should be held in an upright position, his head on his mother's shoulder, and his back patted gently to help him "break his wind." If he is very voracious about his meals it may be necessary to give him a sedative shortly before his feed to prevent over-feeding.

(*c*) *Pyloric stenosis.* — Sometimes vomiting is caused by an obstruction in the opening of the stomach. This is called pyloric stenosis. The vomiting is violent, and the vomit may shoot out a distance of several feet. The baby loses weight rapidly as the food cannot pass down in the usual way. Such a condition requires medical treatment and the doctor must be consulted.

(*d*) *Cyclical vomiting.* — Cyclical vomiting, or bilious attack, is a type of vomiting which occurs periodically, perhaps every two or three months. The cause is not definitely known but is thought to be due to an upset of the fat digestion. The attack starts suddenly and may persist for two or three days. Even water is brought up. The child becomes drowsy, the skin takes on a slightly yellowish tinge, the breath may have a sweetish smell and the tongue is heavily furred. During the attack small amounts of water sweetened with glucose may be given frequently; the child may also have barley sugar to suck. In between the attacks, only small amounts of the fatty foods should be given. The bowels must be kept open. As the child grows older he tends to grow out of this complaint.

Colic is due to painful contractions of the intestines. The baby screams and draws up his legs; generally he passes flatus (wind). If the hand is placed on the child's belly, the muscles are felt to be very hard. The condition is due to indigestion from an incorrect diet or the eating of irritating foods.

Relieve the pain by applying warmth to the abdomen by means of a poultice (*see* pages 228-229) or a hot-water bottle. (Be careful that this is covered, so that the baby will not be burnt.) A teaspoonful of dill water or peppermint water will help to bring up the wind and relieve the pain. Purgatives should not be given.

To prevent the occurrence of colic the diet should be carefully regulated (*see* INFANT FEEDING, page 81).

Colic is one of the causes of screaming in infants. Other causes are teething, and discomfort due to the infant being wet or uncomfortable.

Chronic Indigestion is met with frequently in older children, between the ages of three and eight years. The child is thin and does not gain weight satisfactorily. The appetite is poor. The complexion becomes sallow and there are dark rings around the eyes. The tongue is furred and may have a peculiar map-like appearance, geographical tongue. There is usually some looseness of the stools, which may contain slime or mucus and may be offensive to the smell. There is often vague pain in the abdomen.

Regulation of the diet is the most important part of treatment. Starch and fat must be cut down, e.g., sugar, sweets, potatoes, cakes, cream and butter. Meat and fish may be given and small quantities of green vegetables are allowable. A change of air, especially to the country, is often very beneficial.

Worms are common in children. The symptoms are very variable and may be slight; usually indigestion, pain in the abdomen, restlessness and irritability.

The threadworm is the commonest. It is about a quarter-inch in length, of a whitish colour and rather like a thread. The worms are spread by contamination of the fingers by the eggs, as a result of scratching round the back passage. One child may infect another. The finger-nails should be cut very short and, if scratching is persistent, it may be necessary to apply light cardboard splints to the arms at night. Enemas of salt and water (1 tablespoonful to the pint), or of quassia are usually effective. The enema can be given quite easily by the mother (*see* page 240). They are given daily for a week, and then every other day for the second week. If this fails, it may be necessary to give certain medicines to kill the worms.

Roundworms are in most cases solitary. They are long and tapering, rather like an ordinary earthworm. Tapeworms are flat and whitish in colour. Special medicines are required for the treatment of roundworms and tapeworms, and these must be given under the direction of the doctor.

Tonsillitis.—Acute tonsillitis is a very common complaint in children of all ages. The child complains of a sore throat and pain on swallowing. The temperature is usually high and the child feels ill. The tonsils, which can be seen quite easily at the back of the throat on either side, become swollen and red. The surface may be covered with white spots. The doctor should always be called in whenever the child has a sore throat, as the possibility of its being the more serious disease, diphtheria, must be considered.

The child should be isolated from other children (as simple tonsillitis is infectious). He should be given plenty of drinks, e.g., barley water or glucose water. Hot fomentations or antiphlogistine may be applied to the neck. If the child is old enough to gargle he should do so, either with salt and water (half teaspoonful to a tumbler of warm water), or an antiseptic such as glycothymoline The tonsils may be painted with an antiseptic, e.g. Mandl's Paint, using a brush bent at the end.

As a result of several attacks of tonsillitis the tonsils may become permanently enlarged and septic. Then the child is often listless and easily tired. There may be a chronic dry cough and the glands in the upper part of the neck may be enlarged. In such cases it is necessary to remove the tonsils, an operation which, if performed properly, is simple and harmless.

Enlarged Adenoids are often, though not always, associated with enlarged tonsils. The adenoids are small pads of flesh situated at the back of the nose. When enlarged they obstruct the breathing through the nose, and the child becomes a mouth-breather and frequently snores during sleep. Ear trouble is a common sequel. Such children are also very liable to bronchitis since the air which they breathe is cold air, owing to its not having been warmed by passage through the nose. After some time the child develops a pinched and pale appearance. His general health is affected, and eventually deformities of the chest appear (pigeon chest).

It is therefore essential to have the enlarged adenoids removed as soon as possible. Remarkable improvement to health often results. After the operation the child should have breathing exercises to train him to breathe properly through the nose.

Bronchitis, or inflammation of the bronchial tubes, is a very common affection in childhood. It may be caused by exposure to cold, or chilling of the body, or it may be secondary to infected tonsils or enlarged adenoids. Many children suffer from bronchitis during teething. It is a disease which should not be neglected, as in weakly or debilitated children it may develop into broncho-pneumonia.

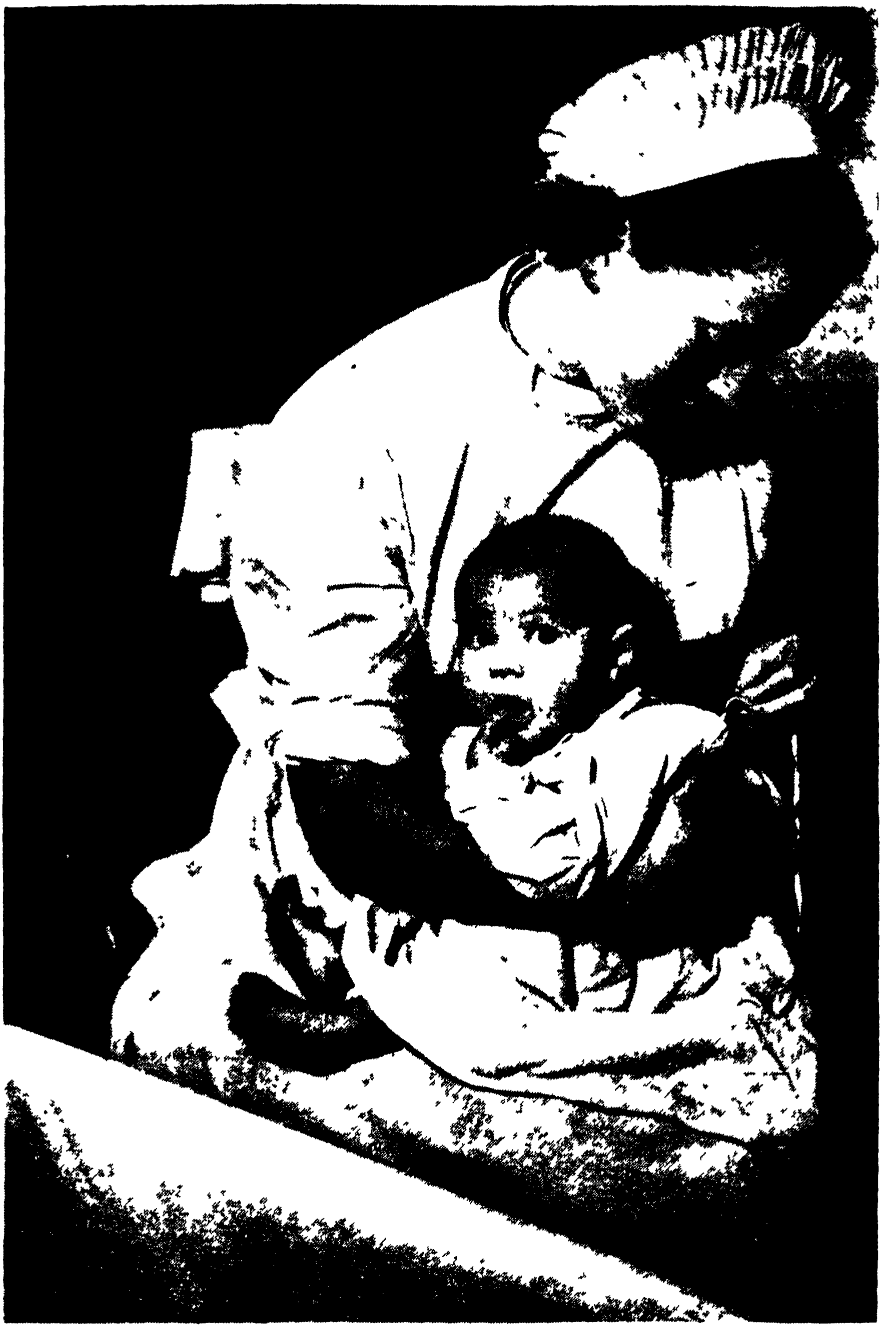
Acute bronchitis starts suddenly with a dry cough and fever. There is usually some pain in the upper part of the chest. After a few days the bronchitis passes into the wet stage and the cough loosens. Phlegm is brought up in considerable quantity.

The patient should be nursed in a well ventilated room, at a temperature of about sixty degrees. The diet should be light and consist mostly of fluids and foods like egg and milk, custards and jellies. In the dry stage a bronchitis steam kettle is very useful for moistening the air. One or two teaspoonfuls of tincture of benzoin may be put in the water which is kept boiling so as to give a steady jet of steam. (The spout of the kettle must not be directed straight at the child, because of danger from scalding.) In the wet stage every encouragement should be given to the child to bring up the phlegm, and the doctor will usually order cough medicines to help him to do so. Care should be taken over convalescence which should, if possible, be spent by the seaside.

In chronic bronchitis there is a persistent cough, and much phlegm is brought up. If the tonsils and adenoids are enlarged they should be removed. If possible, the child should be sent away into the country where he can spend most of the day in the open air.

Pneumonia is of two types. The kind known as lobar pneumonia, which usually affects only one lung, is generally a mild disease in children. Broncho-pneumonia, however, which often occurs as a complication of measles and whooping cough, is much more serious. In both types the child has a high fever, rapid breathing, a cough and often pain in the chest. He should be nursed in a warm, well ventilated room, and, if the weather is warm, he may be put on a balcony or in front of the window. He should be propped up with plenty of pillows. Diet should consist chiefly of fluids, but this may be supplemented with jellies, custards, broths, beef tea, etc. Sleep is very important and to secure this it is often necessary to give a sleeping draught.

Nowadays pneumonia is treated very successfully with the new drug M. & B. 693. While it is being given the patient should not be given eggs or any dish made with eggs. The drug is easily given to children by crushing up the tablet and putting it in a little milk.



The correct way to support a child while undressing him. Garments for a small baby should fasten with tapes, or with fasteners that cannot rub and irritate the child.

Convalescence should not be hastened after pneumonia. A very nourishing diet should be given with plenty of milk, eggs and fruit. Plenty of fresh air is necessary and, if possible, the child should go away for a holiday to the seaside for a time.

Asthma only occurs in people who are born with a special sensitiveness to certain substances, the commonest of which are dust, feathers, emanations from certain animals, such as horses, dogs, cats, and various types of foods, e.g., eggs, fish, etc.

In children, asthma generally starts at about the age of two or three years. It consists of sudden attacks in which the child has great difficulty in breathing; the breathing is wheezy and noisy. The attack passes off suddenly. In between attacks the child may remain quite well. They may occur only occasionally or several times a week.

The attacks can be stopped by means of injections or tablets but they tend to come back. They may sometimes be completely cured by removing the offending substance, e.g., by substituting kapok in the mattress and pillows for feathers. If this is not feasible, it may be possible to make the child insensitive to the substance by a series of injections.

Tuberculosis is a disease which is caused by the tubercle bacillus, a minute, rod-like germ. This germ enters the body of the child, either through the mouth and windpipe and so into the lungs, or through the stomach and bowels. In the former case the infection comes from someone suffering from consumption. This form of the disease may also be contracted by swallowing dust which has been infected by the coughing up of tuberculous spittle. Bowel infection is caused by swallowing milk containing tubercle germs. Most children living in towns are infected by tubercle germs, but fortunately the infection is a very slight one and rarely gives rise to any serious symptoms. In fact, this infection increases the body's resistance to the tubercle germ.

Unlike adults, children do not suffer from consumption, but they may in early childhood develop a serious form of tuberculosis of the glands of the chest or of the bowels. The glands of the neck may also be affected.

In the early stages of tuberculosis the child becomes languid, is easily tired and loses weight. There is often cough and slight fever. It should be emphasized, however, that similar symptoms may occur in less serious maladies. A child with such symptoms should be taken to a doctor for a thorough overhaul.

Tuberculosis is a disease which can, in most cases, be prevented. No young child should be allowed to be in contact with anybody suffering from consumption. All milk (except tuberculin-tested milk) should be boiled or pasteurized. This effectively kills any tubercle bacilli that may be present. The child should get plenty of fresh air and adequate amounts of fatty foods, e.g., cream, butter, etc. Special care should be taken of children who are recovering from measles or whooping cough, as tuberculosis is liable to follow these diseases.

Habits. — Children, especially infants, often develop habits of various kinds. They are more likely to occur in the nervous or highly strung child. Head rolling and head banging are common in infancy. The baby rolls his head from side to side in the cot. The movement may be so vigorous that the hair at the back of the head is worn away. The baby may also bang his head vigorously against the cot sides, or even against the wall. In spite of this he hardly ever injures himself. In fact, he seems to enjoy doing it.

The treatment of this, as of all habits, is firstly to ignore them. If attention is constantly called to them they tend to persist. The cot sides may be padded to prevent any possible injury. Sedatives are only rarely required; the habits will gradually disappear as the child grows older.

Nail biting and thumb sucking are more troublesome habits. The longer they persist, the more difficult they are to deal with. Scolding should be avoided, and, if the child is old enough, his active co-operation should be obtained. It is important that he should have sufficient to occupy himself with. Children who are bored easily develop habits in order to occupy themselves.

In the early stages it is sometimes possible to cure thumb sucking and nail biting by the application of aloes or quinine to the fingers or thumb, or by applying cotton gloves and cardboard splints to restrict movement.

Masturbation is playing with the genitals, and must be regarded as much a habit as thumb sucking. It has no sexual significance, though, as in all habits, the child derives pleasure from it. It is common in girls as well as boys. The parts are rubbed with the hands or the thighs are rubbed together. Flushing, sweating and drowsiness often occur afterwards.

At the beginning, the habit can usually be cured fairly easily. The parents' attitude is important. They must be careful not to adopt a "moral" attitude or to show horror or disgust. They should say to the child, "Little boys don't do that"; not "You are a very wicked and naughty boy to be doing that." The latter makes the child frightened, while it does not make him stop the habit.

Any source of irritation, such as a tight prepuce (foreskin), must, of course, be dealt with, and advice must be obtained from a doctor. The parts should be kept carefully clean. By means of games and toys the child's attention should be diverted. If he is interested this habit, like others, is less likely to get a hold of him.

Habit Spasm is a name given to various types of jerking movements, very commonly met with in the nervous type of child. A movement is constantly repeated, e.g., a raising of the eyebrows, sniffing of the nose, blinking, twitching of the head, etc. Habit spasm is different from chorea (St. Vitus's dance) in which the movements of the body are much slower and writhing in nature, and more variable than habit spasm. As in other habits, scolding and calling attention to it does more harm than good. The child should be told that it is a habit and that he can largely cure himself by trying to overcome it. As soon as the child realizes he is making the movements he will be able to exert his will to stop them.

It is important to build up the general health by means of rest, fresh air and a generous diet. A holiday from school is often desirable because such children are often overtaxed mentally, and a complete change of surroundings is beneficial.

Enuresis means bed-wetting and is very much commoner at night—(nocturnal enuresis) than in the daytime (diurnal enuresis). Control of the bladder is acquired gradually, and by careful training it can often be established in the first year. In any case, by three years a child should have developed complete bladder control. In certain diseases, however, enuresis may be present. Sometimes after a severe illness bladder control is lost, and enuresis may persist for some time afterwards. The urine may be too acid, causing irritation of the bladder; but in most cases the enuresis is a nervous affection. The doctor should always be consulted in these cases.

In diurnal enuresis the urine is passed very frequently, perhaps every quarter or half an hour. The treatment is to make the child pass water at fixed times, at first every hour, then every hour and a half, then two-hourly, and so on. On no account should he be allowed to run to and from the W.C., which should be locked, if necessary. Accidents may happen, but control will be gradually established.

Nocturnal enuresis is more difficult to deal with, especially if it is of long duration. On no account should the child be scolded (he is usually a sensitive type) since this will make him more nervous still. He should be encouraged, especially if he has a dry night. It is a good idea to have a calendar and to mark the dry nights with a red circle. This kind of thing begets confidence in the child. No food or fluids should be allowed after 5 p.m. He should pass water immediately before going to bed and should be fully awakened at a fixed time, e.g., 10 p.m. or 11 p.m. each night, and made to pass water. He should sleep in a well ventilated room and the bed-clothes should be light and airy. Certain medicines are beneficial, and these will be prescribed by the doctor.

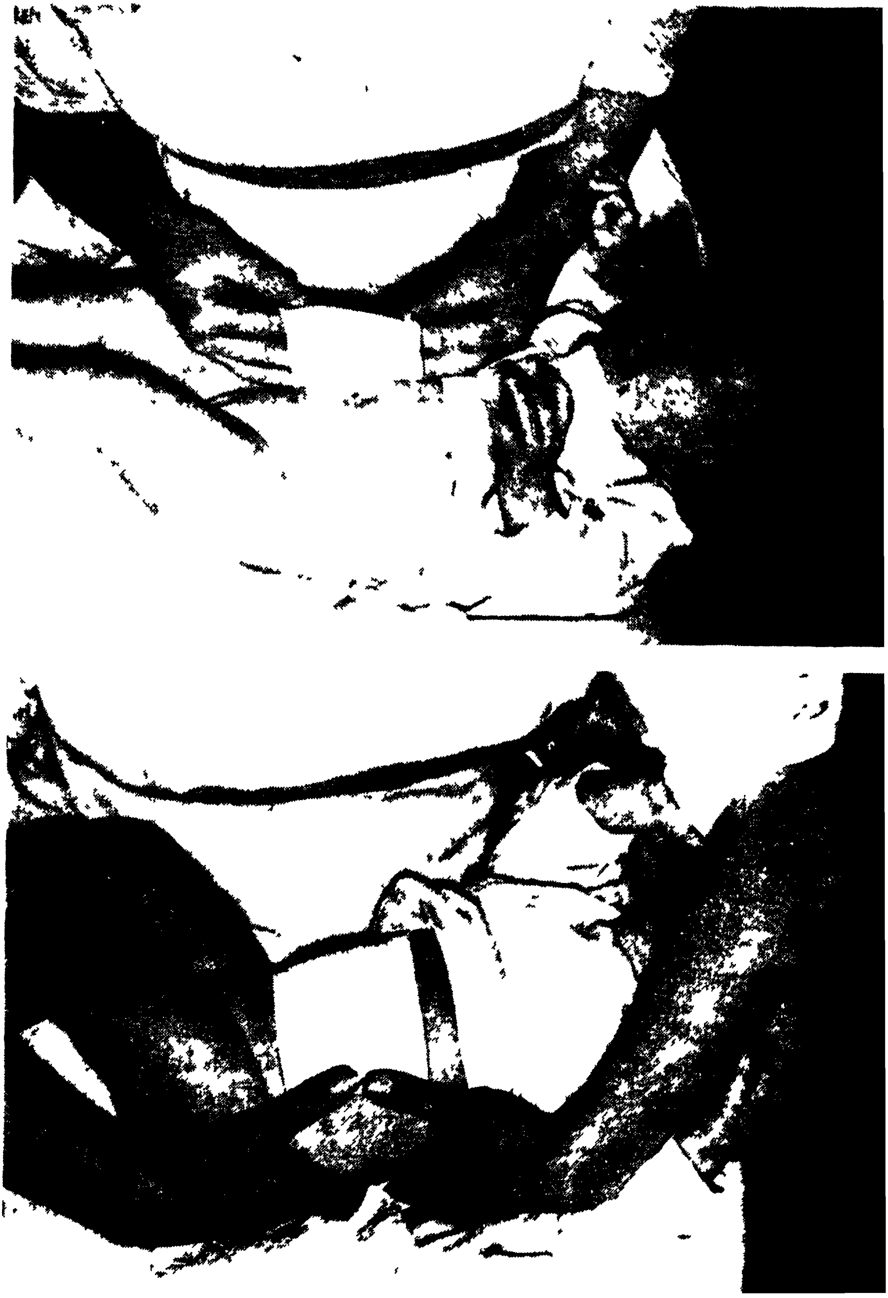
Enuresis is a distressing complaint, but in most cases the children eventually grow out of it.

Night Terrors.—Children, generally sensitive and nervous children, sometimes wake up in the middle of the night screaming and obviously terrified. Such children must be handled with care. Anything that would engender fears, such as frightening stories, should be avoided. Plenty of fresh air, a light diet and careful regulation of the bowels are important. Enlarged adenoids should be deal with, as they will interfere with the child's normal sleep.

Convulsions.—Convulsions, or fits, are commoner in children than in adults and do not have the same serious significance. There are many causes of convulsions, such as rickets, high fever and even severe constipation. Epilepsy is a rare cause in children. The doctor should always be consulted if a child has a convulsion. In a convulsion the child's limbs become stiff, the eyes are staring and the face is blue. He loses consciousness, and twitching movements of the limbs occur. These gradually subside and the child recovers consciousness and then passes into a deep sleep. He may bite the tongue and pass urine during the period of the convulsion.

The doctor is usually not able to get to the house until a convulsion is over. The mother should place a pencil or small piece of stick in the mouth, to prevent the tongue being bitten. She should loosen the clothing round the neck and place the child so that he cannot injure himself. If possible, the child should be put in a bath of warm water (100 to 105 degrees Fahrenheit) for a few minutes; this produces a very soothing effect on the brain. Certain drugs stop the fits, and will usually be ordered by the doctor.

One type of attack or fit occurs in young children due to holding of the breath. This occurs generally in wilful, spoilt children and may be very frequent. When the child is upset, he cries and then holds his breath. His face becomes very blue, almost black. Suddenly the breath is drawn in and the blueness disappears. Afterwards the child is pale and limp. There is no muscular twitching. The most effective



Strapping a baby for hernia. A firm pad of cotton wool, or even a coin wrapped in cotton wool, should be placed over the umbilicus. Wide adhesive strapping is then applied firmly from one side of the abdomen to the other as shown in the two illustrations above.

treatment is to throw cold water over the hands and face as soon as the convulsions start (there should be a bucket of cold water and a sponge handy). This makes the child breathe and stops the attack.

Rheumatic Fever.—This disease is in itself not necessarily serious, but as it may leave permanent heart injury must be regarded seriously. It is fully dealt with on pages 202 to 205.

Impetigo (*see* CHAPTER VII.).

Eczema (*see also* CHAPTER VII.).—Eczema occurs in young infants, generally those who have specially sensitive skins. They may also suffer from asthma. The eruption may occur on any part of the body and consists of tiny red spots which are filled with fluid. These burst and the skin is covered with a watery fluid (weeping eczema). After a time, this dries and a crust forms. The disease may last for months or years, but usually gets better as the child grows older.

In the weeping stage the skin should be swathed gently with a cooling lotion such as calamine lotion. When crusts form they must be removed by bathing, or by means of starch poultices. Zinc or tar ointments are then applied. It may be necessary to prevent the child from scratching by binding up the arms with cardboard splints. The child should have a normal diet, unless some article of food is definitely found to be making the disease worse, when this food should, of course, be omitted. After getting rid of the crusts no soap should be used; the skin should be cleansed with olive oil.

Hives, or nettle rash, occurs in early childhood, between the ages of two and seven. It is generally brought on by some article of food, e.g., excess of sugary or starchy foods and fresh fruit, especially bananas. It is not infectious. Small red blotchy wheals appear on the body and limbs. Crops come out every few days. The rash is irritating and gives rise to much scratching.

Treatment consists in omitting the offending food from the diet. Calamine lotion should be applied frequently to the rash.

Scabies is caused by small parasites which burrow under the skin, especially in the webs of the fingers and toes. The body is also affected. The rash is extremely itchy and the disease is most contagious.

To get rid of the parasite, the affected parts should be scrubbed with soap and water. This lays open the "runs" made by the parasite. For three successive nights sulphur ointment should be rubbed in. The next night a bath should be given. After cure, the clothes and bedding must be disinfected.

DEFICIENCY DISEASES

These diseases are caused by the absence from the diet of one of the vitally important vitamins.

Rickets.—This is a disease occurring in infants and is caused by lack of vitamin D. This vitamin is found in animal oils and fats, e.g., butter, cream, milk, etc., and also in the liver of certain fish, such as the cod and halibut. Strong sunshine enables the body to make its own vitamin. This is why people living in hot tropical climates do not generally develop rickets even though their diet is deficient.

Human milk contains much more vitamin D than cow's milk. Rickets, therefore, is extremely rare in the breast-fed infant and only occurs if the diet of the mother is very deficient in the vitamin, or if the baby has been suckled for too long a period.

Symptoms of rickets usually appear between the ages of six and eighteen months. The infant becomes irritable, loses his appetite, and, if he has begun to walk, may "go off his legs." The digestion is often upset and the child may develop bronchitis. The most serious feature of the disease is a softening of the bones, so that they bend very easily. The legs are most affected since they have to bear the weight of the body and they often become very bent. Bending of the arms may also occur. The bones of the wrist and ankle may also swell, and become much enlarged. The teeth in rickety children are delayed in appearance and decay very easily. Convulsions and a certain kind of croup are also liable to occur in this disease.

Rickets is a disease which can easily be prevented if proper precautions are taken. Breast-fed infants will not develop the disease providing the mother's diet is satisfactory and if she does not continue suckling the child after the tenth month. When an infant is bottle-fed, it is wise to give him from the third month onwards cod liver oil or halibut oil (*see* diet charts). If this is regularly given, rickets will not develop.

The disease is easily cured by giving large doses of cod liver oil or similar substances. In addition, artificial sunlight (ultra-violet light) should be given by hospital treatment. In the summer, of course, the infant should be put out in the sun with nothing on but a pair of knickers.

Scurvy is caused by absence of vitamin C from the diet. This vitamin is found in fresh fruits and vegetables, especially lemons, oranges, tomatoes, prunes and potatoes.

Scurvy is extremely rare in breast-fed infants, but is commonly met with in babies who are being fed on artificial food. The main symptoms of scurvy are hæmorrhages. Bleeding from the gums occurs; they swell up and become a bluish colour. Bleeding may also occur into the back of the eye socket, so that the eye is pushed forward, and also from the bowel and kidneys and sometimes into the skin. In all cases of scurvy there is hæmorrhage round the bones, especially those of the legs. As a result, the legs become extremely tender when touched, and so painful do they feel that the baby is unwilling to move them.

Scurvy can be rapidly cured by giving fresh milk and large amounts of the vitamin, either in the form of

Rheumatic knees in children. Notice the swollen joints and wasted legs. The treatment of rheumatism in children is dealt with in Part II, Chapter V, " Nursing of Heart Diseases."

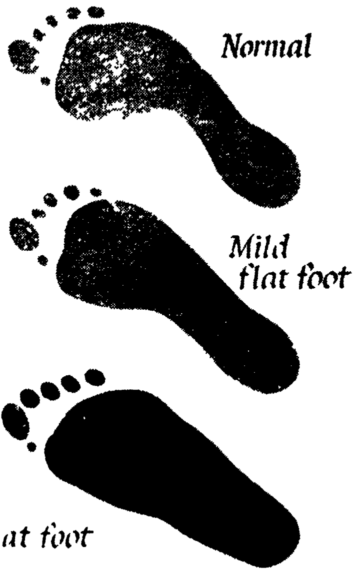


Diagram showing normal, and flat feet.

orange or tomato juice or potato cream. This is prepared by baking potatoes in their jackets, scraping the floury parts under the skin and making it into a cream with a little milk. Scurvy may be prevented by giving to all bottle-fed infants daily some orange or tomato juice (*see* diet charts).

Certain mild deformities are frequently met with in young children. The commonest of these are knock-knee and flat feet. In knock-knee the knees tend to touch each other when the child walks. If, while the child is sitting down, the knees are placed together, there is a space between the ankles which cannot be brought together. The legs appear to be bent inwards. This deformity is due to an irregularity in the growth of the bones of the legs. It generally corrects itself as the child grows older.

In all but severe cases it is sufficient to raise the inner side of the shoe by means of a wedge a quarter or one-third of an inch in height. An operation or a walking apparatus will hardly ever be found to be necessary.

Flat feet is a condition which may be associated with knock-knee, but it more often occurs by itself. Normally, the foot should be arched so that only the outer side of the foot comes in contact with the ground. In flat feet, the arch drops, partially or completely, so that the inner border of the foot touches the ground. The difference between normal and flat feet can be shown by wetting the sole of the foot and making an imprint on the ground (*see* diagram). Children with flat feet often have pain over the instep or under the sole of the foot, especially after they have been standing. In mild cases there are frequently no symptoms.

Treatment consists in strengthening the muscles of the ankle and foot. In no circumstances should shoe supports be worn. These exercises are helpful:—

1. The child should raise himself on tiptoe and then sink back on the heels.
2. While standing, the feet should be turned outwards so that the weight of the body rests on the sides of the feet. The toes are then tucked in towards the sole.
3. The child should sit on the edge of the bed and twist the ankle round in all directions.

Each of these exercises should be repeated a dozen times, night and morning.

As in knock-knee, it is often helpful to wedge the inner sides of the shoes. This tends to throw the weight on to the outer side of the foot.

Bow legs are often met with in young children and, like knock-knee, are due to an irregularity of growth. They must not be confused with the much more severe bending of the legs met with in rickets. The deformity rights itself as the child grows older.

CHAPTER III

EMERGENCY MIDWIFERY & DISORDERS OF WOMEN

by E. R. REES, M.D., M.R.C.O.G.

(*See also Part I. Chapter V. Pregnancy and Diseases of Women*)

It has been pointed out in Chapter V that it is not common for any of the more serious ailments of women to be treated at home; so in this chapter we are going to discuss chiefly all that the home nurse should know of the most important function of women, childbirth, and its possible complications or attendant disorders.

There are also the minor ailments and discomforts of women, many of which could be helped enormously by a little more knowledge about them. This I have tried to give you.

COMPLICATIONS OF PREGNANCY

There are some accidents and complications of pregnancy the management of which may not be within the province of the home nurse. She should, however, be aware of the chief untoward incidents that may happen.

Abortion.—Pregnancy may be interrupted any time after the implantation of the embryo and before full maturity has been reached. When it occurs before the twenty-eighth week it is called an abortion or miscarriage. When it occurs after the twenty-eighth week but before the full term, it is called premature labour. The nature of the process is much the same in both, the difference being one of degree only.

Abortions are very common; it is probable that at least one pregnancy in four ends in miscarriage. And so something like 100,000 miscarriages occur in this country each year, and it may well be the lot of the home nurse to assist in the management of a miscarriage. Much ill health may follow abortions, because although the process is similar in most respects to a full time labour, many women regard them lightly, and do not bother to seek advice. The first duty of any home nurse is to insist on proper assistance directly a miscarriage is threatened.

Symptoms.—Bleeding is usually the first indication. This may at first be slight in amount, or there may be a profuse gush. It is due to the separation of the attachment of the baby to the lining of the womb, and the severity of the bleeding will naturally depend on the amount of separation that has occurred. If the separation is slight there will be very little bleeding, and there may be still sufficient attachments or roots to maintain the life of the fœtus. If this is the case the pregnancy continues, and the bleeding is referred to as a threatened miscarriage.

If, however, the separation has been sufficient to cause death of the fœtus, then the uterus will contract in an effort to expel it. These contractions cause pain, which is the second symptom of a miscarriage. The pain is cramp-like and intermittent, that is, it comes and goes; it is not unlike the pain of menstruation in character although it may be much more severe. Finally, it might be added that pain and bleeding may commence together.

Treatment.—If a pregnant woman begins to bleed, she should be put to bed immediately. Medical advice should be obtained at once if possible, because certain threatened miscarriages can be arrested by the administration of glandular preparations if seen in time. In any case, the miscarriage, if it is only in the threatened state, is much more likely to be arrested if the patient is resting in bed. Clean towels should be placed beneath her and the blood may be absorbed into cotton wool or sanitary pads. A bed-pan may be used if it is available and the bleeding severe, but on no account should she be allowed to use the lavatory. This is because miscarriages may be incomplete and it is important to retain everything that is passed through the vulva for the inspection of the doctor who can then decide whether the miscarriage has been completely carried through, that is, whether it includes all the fœtus, the membranes and the after-birth.

REASSURING THE PATIENT

No aperient should be given; a violent action of the bowel is likely to be accompanied by violent contractions of the womb, which will naturally aggravate the condition. Liquid paraffin should be given if constipation develops. The diet should be light, and adequate warmth is supplied by plenty of bed-clothes and hot-water bottles. The nursing of the patient is much easier if she is in her night attire. She should therefore be disrobed unless the bleeding is very severe.

The patient will probably be frightened, and the home nurse should do her very best to calm and comfort her. Point out, for one thing, that miscarriages are very common, and that she will soon make a rapid recovery.

If, by all signs and symptoms, the abortion is inevitable and the home nurse has done all she can to secure medical aid immediately, what should she do next? Fortunately in the majority of cases there is no need to do anything because most miscarriages will be completed naturally and spontaneously. If, however, the patient is suffering much pain or there is severe bleeding, and provided the nurse already has indisputable evidence that the miscarriage is inevitable, then she may give the patient an enema.

IMPORTANCE OF CLEANLINESS

Finally, the nurse should remember that when a miscarriage is taking place, the mouth of the womb is opening and there is a raw area or "wound" inside it. This wound results from the separation of the embryo from the lining of the womb. It follows, therefore, that germs can readily ascend through the open mouth of the womb and enter the mother's blood stream through the wound, thus causing blood poisoning. It has also been discovered that the air breathed out by many people contains dangerous germs and that cases of blood poisoning have resulted from germs conveyed in this way. For these reasons extreme cleanliness is important; the nurse should scrub her hands before giving any attention and she should wear a mask over her face when she has to stand near the vulva.

Albuminuria of Pregnancy. — Most women are aware now that the urine should be tested during pregnancy. This is in order to detect albuminuria and to correct the condition in its early stages. If it is not detected at an early stage, the patient may develop headaches, swelling of the feet, dimness or blurring of vision, abdominal pain or vomiting. Finally, unless prompt treatment is given she may develop fits; the condition is then called eclampsia.

The home nurse should know what a fit or convulsion is like. It may commence with twitchings in the face, tongue or limbs. Then comes a phase lasting about twenty seconds when the body becomes rigid and breathing ceases. The trunk may become so arched that the patient may appear to be resting on her head and heels. The face is bluish, and the protruded tongue may be bitten between the clenched teeth. This stage is followed by one in which irregular muscular contractions occur all over the body and the patient foams at the mouth. Breathing is now resumed and the colour tends to improve. This stage lasts two to five minutes. Following this the patient may be sleepy or dazed, or she may lapse into coma.

TREATMENT OF A CONVULSION

It will be the nurse's duty, if she is present, to try and minimise the damage that may result. Something should be placed between the teeth immediately in order to prevent the tongue being bitten. The head should be turned on one side; this prevents the tongue falling backwards, and thus obstructing the entry of air. As soon as the fit is over, every effort should be made to ensure absolute peace and quiet for the patient. There should be no talking and no noise; the patient's ears should be plugged with cotton wool, and no attempt should be made to undress her. She should be made comfortable on the bed with plenty of clothes to keep her warm. These precautions are important because any disturbance may provoke another fit. Medical assistance should be sought immediately.

Antepartum Hæmorrhage.—Bleeding occurring in the last three months of pregnancy is known by this name. It is due to separation of the after-birth, or placenta, as in the case of a miscarriage. It is always serious, and the home nurse's duty consists solely of putting the patient to bed and sending immediately for medical assistance.

Labour.—The expulsion of the fœtus from the mother's womb is called labour. In the first stage, contractions of the uterus draw its mouth upwards over the head of the fœtus in much the same way that an elastic stocking (without toe part) would be drawn over the foot. Having opened the mouth of the womb to its full size so that the head can pass through it, labour now enters its second stage. In this stage the fœtus is expelled from the womb through the vagina and vulva as a result of further contractions of the uterus aided by the mother's expulsive efforts. The third stage is the interval from the birth of the baby until the after-birth is born.

The onset of labour is accompanied by pains, and often by a slight show of blood. The pain is usually felt in the small of the back, and from here it often spreads round to the front of the abdomen. If the hand is placed on the abdomen during a pain, the womb will be felt to harden, as the pain is nothing more than the contraction of the muscle of the womb.

PAINS IN LABOUR

The pain usually lasts about thirty seconds but recurs again after an interval of ten to twenty minutes. As labour progresses, the pains become more severe in character and the interval between becomes less and less.

Towards the end of the second stage the contractions become very powerful, and pain follows pain in quick succession with only a short interval between. Finally, during a powerful contraction or pain, and accompanied by violent straining on the part of the mother, the baby's head distends and is pushed through the vulva. The rapidity of this final stage will naturally depend on the strength of the pains, the size of the baby and the size of the outlet. It may take several pains, or it may be accomplished in one. Naturally a small head, a large outlet and strong contractions will all contribute to shortening the time.

After the birth of the baby the pains usually cease for five or ten minutes. The womb has now shrunk considerably in size. The after-birth is attached to the wall of the womb, and as it is not elastic, it must be torn off when the womb is shrinking.

With the next pain, the after-birth is usually expelled into the lower part of the womb and vagina. Its final ejection from here may require assistance. This is rendered by the doctor or nurse who grasps the uterus through the thin abdominal wall and pushes it downwards and backwards.

DURATION OF LABOUR

The duration of labour varies considerably but during a first confinement the first stage usually occupies twelve to eighteen hours, the second stage about two hours, and the third stage thirty minutes. The variation, however, is much greater than this and the first stage may be only a couple of hours, or it may take several days. With subsequent confinements the time is generally much less, and it is not unknown for labour to be completed in a matter of minutes. Naturally such a quick labour is exceptional; in normal cases, labour seldom occupies less than four or five hours.

It must be stressed at this point that it is forbidden by law for any person who is not a qualified doctor or midwife to conduct childbirth as a means of livelihood. During a national emergency, however, it may very likely fall to the home nurse to render what assistance she can to the woman in labour, and she should have some knowledge of the subject.

It is worth remembering that labour to a woman is a time of mental and physical stress. The mental stress is much relieved by the presence of someone who inspires confidence and is sympathetic. A capable home nurse should be able to supply both these qualities, as well as knowing what to do.

FIRST DUTIES OF NURSE

The first step therefore is to reassure the patient and explain to her that labour is a long process and that she will have to endure it; the nurse then proceeds with her preparations for the confinement, and the efficient execution of these should do much to gain the confidence of the patient and make her feel that she is going to be helped by someone who knows what to do. These preparations will naturally depend to some extent on what stage labour has already reached when the home nurse arrives and on its rate of progress. They will consist of attention to the patient, preparation of the bed and of the room, and getting ready bowls, swabs and sterile scissors for the cord. Whilst these duties will be separately described, the order of their execution will naturally be dictated by necessity.

The Patient.—Fortunately, the patient requires very little active treatment in the first stage of labour. She should, however, be given an enema. Look again at the diagram showing a view of the pelvis region on page 67. From this you will realize how a loaded bowel diminishes the space available for the passage of the baby. Furthermore, the descending baby will squeeze out the bowel contents in front of it and thus cause repeated soiling. Finally, the strength and character of the pains or contractions are often increased after an enema is given. If time permits, the administering of the enema should be followed by a hot bath.

The patient should be clad in a nightdress and dressing-gown and allowed to walk about in the first stage of labour. In fact, some simple occupation might well help to keep her mind from dwelling on her pains. There is usually a slight discharge, which may be bloodstained, from the vagina during labour; for this reason a sanitary pad should be worn; to ensure its sterility it is as well to singe it in front of the fire before applying it. The side which has been singed and which will be in contact with the vulva should naturally not be touched by the nurse's hands.

EARLY STAGE OF LABOUR

If the first stage lasts a long time, the nurse may be tempted to ask the patient to strain or bear down. Now this is quite wrong, for when the time comes for the patient to bear down, there will be a natural urge to do so. The diet should be light and given at short intervals. She should be encouraged to pass water frequently.

Finally, let it be remembered that when attention is being given to the patient, the nurse should wear a mask, and her hands should be scrubbed for several minutes before touching the patient in the vicinity of the vulva.

The Bed.—The eiderdown and blankets are usually removed from the bed; the nurse, however, must use her common sense, and if there is any question about there being sufficient warmth for the patient, one or more blankets may be kept on the unused part of the bed so that they can be drawn over her when the nurse thinks it necessary.

The preparation of the remainder of the bed will depend on whether a sterile drum (or box) of dressings is available. Always ask the patient if she has one in the house, because more and more women are now getting them in readiness. These drums contain sanitary pads, cotton wool, string and dressings for the cord, mackintosh sheet, draw sheet and an accouchement sheet. All these are sterile, and the nurse's hands should be well and carefully scrubbed before removing anything from the drum.

PREPARING THE BED

The mackintosh sheet is placed on the bed with its centre over the area where the patient's buttocks will rest. It should be above the bed sheet. Still further protection to the mattress is obtained by placing sheets of brown paper under the bed sheet. The accouchement sheet is a thick layer of cotton wool enclosed in gauze. This is not brought out until labour is well advanced and then it is placed on the mackintosh sheet and just under the patient's buttocks.

If a sterile drum is not available the mattress must then be protected with many sheets of brown paper placed under the sheet, and a good big bath towel is placed under the patient instead of the accouchement sheet.

The Room.—Unnecessary pieces of furniture should be removed. There should be room for bowls on a table or chair which should be conveniently placed near the right side of the bed where the nurse will stand when awaiting the actual birth of the child. There should be a bucket just under the right edge of the bed which will be used to receive the dirty swabs.

The cot should be ready, and also some flannel or a piece of old clean blanket to wrap round the baby as soon as it is separated from its mother.

The floor of the room especially along the right side of the bed may be protected by an old bed sheet or by many sheets of newspaper. This will save much cleaning up afterwards.

Swabs, Bowls, Ligatures, etc.—While these preparations have been in progress, the thoughtful nurse will already have ensured an ample supply of both hot and boiling water. If no sterile dressings are available, about two dozen handfuls of cotton wool are boiled in a saucepanful of water. Having decanted some of the boiling water away, the swabs are poured into a bowl which has been previously well washed with boiling water. If possible, about one tablespoonful of a mild antiseptic should be poured into about one pint of water containing the swabs, and should be well mixed with the water by stirring the swabs round the bowl. These swabs should be covered over with an inverted sterile bowl until they are required. A few small swabs should be placed in a sterile basin and covered with some boracic solution if available. These will be required for the baby's eyes.

The nurse should also boil two pieces of string, each about twelve inches long, and a pair of scissors. These may be placed in a small bowl containing some antiseptic solution.

As already described, the duration of labour may be so short that the home nurse will not have time for all these preparations. The nurse will then be guided by the immediate necessities and there should be no difficulty if she has carefully perused this description. For instance, if the waters have already burst and the patient is straining violently with her pains, it is much too late to give an enema, and the nurse must devote what time she has to the preparation of essentials such as sterile scissors and thread, etc., that she must use.

The Second Stage of Labour is often heralded by a sudden gush of water; this may, however, occur before the end of the first stage and is due to the bursting of the water bag in which the baby lies. Vomiting often occurs when the patient enters the second stage. As already explained, the second stage commences when the mouth of the womb is fully open, and continues until the baby is born. The patient should now be lying on the bed and it will be seen that she will hold her breath and strain during a pain. This straining or bearing down should be encouraged, and the patient may find that she can do this best by lying on her left side with her feet resting against the bottom of the bed.

Sometimes, however, better progress is made when lying on her back with her hands under her knees which are well drawn up. Between the pains the patient should be told to relax and get as much rest as she can. Should any fæcal matter be squeezed out of the rectum (back passage), it should be carefully swabbed away. The swab should always be drawn over the entrance to the back passage from before backwards. If done in the other direction the vulva will be contaminated with fæces.

EMERGENCE OF THE HEAD

The technique employed when guiding the head as it emerges is beyond the scope of the home nurse. She can, however, be of service by making the patient cry out and cease straining as the baby is emerging. The nurse must be warned that at this time the pains are very powerful, and the patient has an almost uncontrollable desire to strain hard; if she is to desist from straining she must be told very firmly, and it is wise to prepare her beforehand,

and tell her that she will be asked to cry out and stop straining even though she will find it very difficult. In this way, the baby's head will not be thrust through the vulva so violently and there will not be the same tendency to tear the skin behind the vulva as there would be otherwise.

Management of the Baby.—As soon as the baby is born, its eyes are gently wiped with the swabs already prepared for this purpose. The mouth is then cleaned out by means of a piece of gauze wrapped round the finger. Four or five minutes are allowed to elapse and the cord is then tied in two places at about two inches and four inches from the navel. It is important to tie the ligatures (thread) tightly, because the cord tends to shrink a little, and bleeding from the cord might result. The cord is then cut between the two ligatures with the sterile scissors. The baby is wrapped in a flannel and placed in its cot. The cautious nurse will inspect the cord stump a short while later in order to make sure there is no bleeding; it is quite a common practice to retie it.

The Management of the Third Stage of Labour.—It will probably surprise the home nurse to learn that this will constitute one of her greatest responsibilities. On the one hand, a little timely assistance may be of great service to the patient, while on the other hand, unnecessary interference may be very harmful. The following directions should therefore be carefully observed by the home nurse. The patient should be turned over on her back if she is not already in this position. A small bowl should be placed under the vulva in order to receive any blood that may appear. The patient frequently shivers at this point, and if she feels cold, one of the blankets may be thrown over the upper part of her body. But shivering does not always indicate that the patient is cold; it is often seen on a hot summer's day when the temperature of the room is quite high.

THE AFTER-BIRTH

The abdomen of the patient should not be touched for fully thirty minutes. By this time the after-birth has often separated and has passed from the upper part of the womb into the lower part, or even into the vagina. Evidence of separation is given by the lengthening of the outside cord and often by a slight gush of blood. The recognition of the descent of the cord may be rendered easier by tying another piece of thread around it near the vulva immediately after the baby is born. The further descent of the cord will be immediately revealed by the gradually increasing distance between the thread and the vulva.

EJECTION OF THE AFTER-BIRTH

The ejection of the after-birth from the lower part of the womb or the vagina is usually carried out in the following way. Standing on the patient's right side, the left hand, with the palm facing towards the patient's feet, is dipped into the abdomen in the region of the navel. In this way a swelling with a rounded upper border will be felt. This is the womb, and if it is well contracted it will be easy to feel as a firm dome-shaped swelling reaching up to about the navel. If on the other hand it is not contracted well, it is difficult to feel. Fortunately the attempts to locate it with the tips of the fingers will cause it to contract and become firm. If it feels quite firm, and if thirty minutes have elapsed since the birth of the baby, then it is permissible to grasp the womb firmly through the lax abdominal wall by dipping the fingers behind it, while the thumb presses on the front; the womb is then simultaneously squeezed and pushed towards the vagina. The after-birth should then appear at the vulva. Attached to the edge of the after-birth are the membranes or linings which enclosed the fluid cavity in which the fœtus lay. These linings are very thin, and if the after-birth were allowed to drop from the vulva into a bowl its weight would tear through some of the linings which may be still inside the womb. Consequently there should be someone ready to receive it and to support its weight; the tug or pull exerted on the membranes by twisting the after-birth will often be sufficient to draw them out without tearing, which will avoid much complication.

Now these instructions are given to you here with some misgiving; again it *must be stressed urgently* that the home nurse must not on any account interfere with the third stage of labour if there is any possibility of assistance being obtained from a doctor or midwife, even after some hours. Finally, it is always worth while asking the patient to give a powerful cough. The sudden contraction of the diaphragm may quite likely jerk the after-birth out of the vagina or lower part of the womb and make it unnecessary to undertake the task of grasping the womb through the abdominal wall.

THE MOTHER'S COMFORT

As soon as the after-birth is born, the vulva and adjoining areas are quickly cleaned with the sterile swabs. The vulva is covered with one or two sterile pads and the patient is rolled on her side; the buttocks are washed and dried and the accouchement sheet (or big towel) is rolled over underneath her. A clean sheet or a draw sheet is now placed behind her, and as she is rolled backwards she comes to lie on the clean sheet. She is now rolled over on the other side and the dirty accouchement sheet is removed and the toilet completed. Her nightdress is changed if necessary, and she is quickly covered with bed-clothes; hot-water bottles are supplied if she is feeling cold. A hot cup of tea is much appreciated at this juncture, and two tablets of aspirin will often alleviate the mother's discomforts and help her to secure a well earned sleep.

THE BABY

The baby is then bathed and dressed. Note should be made if urine is passed or if the bowels have acted. The nurse must not be alarmed by the appearance of the first stool, which is viscid, dark greenish and odourless. If the cord has not been retied, it is a wise precaution to apply a second ligature now.

It is customary to keep the mother in bed for at least the first ten days after childbirth. During this time the womb gradually shrinks towards its normal size, the relaxed joints regain their former state, and the mother has a good opportunity of recovering from the physical effort of childbirth.

The same care that was observed during labour to prevent germs reaching the mother should be continued. The temperature and pulse should be recorded night and morning. She should sit well up in bed for the greater part of the day. This facilitates the drainage of the discharge from the womb, as will be readily appreciated if the diagram with the side view is again consulted. The position of the bladder should also be noted. When the patient is lying on her back, a heavy distended bladder would tend to push the uterus backwards. The bed-pan should therefore be used at regular intervals to prevent undue distension of the bladder, and the patient should be encouraged to lie on her face for an hour each day.

Menstruation and some of its Commoner Disturbances.—The meaning of menstruation has been explained under the section dealing with physiology. From this the reader will have gathered that menstruation is merely the shedding of the prepared lining of the womb which follows the monthly ripening of an egg. If the egg has not been fertilized the lining will not be required and is cast away.

The nature of menstruation has often been shrouded in mystery and superstition. Even today many women believe it is unwise to bath during the period; some even consider that frequent changes of clothing are detrimental to health at this time. This, of course, is completely wrong! Cleanliness is never more important than at these times. Cold baths or sea-bathing, except for those very accustomed to them, should be avoided, as they may suddenly arrest the period.

Overwork at school or excessive fatigue should be avoided, especially by the young in whom the rhythm may not yet be properly established.

The menstrual discharge is usually collected on to an absorbent sanitary pad which is worn over the vulva. These pads should be unirritating and should be changed frequently. There are plenty of varieties on the market.

Amenorrhœa or Absence of Periods.—It must have been gathered from the preceding paragraphs that regular monthly periods are not essential to health. For instance, women who have had the womb removed do not suffer because they do not lose blood every month. On the other hand, the cessation of the periods usually indicates some disease or disturbance in the body, and their absence may be Nature's method of helping in combating the disease. When, for example, the cause is severe anæmia, the cessation of menstruation prevents further aggravation of the condition. There are, however, innumerable causes and it is the home nurse's duty to see that medical advice is sought.

Menstrual irregularities are very common in the 'teens, and a girl who has started menstruating at fourteen will often cease for a year or longer. While it is always better to seek advice, it might be stated that the majority of these cases right themselves as they get older.

Finally, it should be remembered that the commonest cause of cessation of periods is pregnancy.

The treatment is hardly in the province of the home nurse but it is worth mentioning that a wide and varied diet, regular exercise, fresh air and adequate rest are important factors in the normal maintenance of this function.

Excessive Loss at the Periods.—It is difficult to define what constitutes excessive loss at the periods, and there are wide variations within the bounds of normality. Obviously the loss of an amount of blood greater than can be made good before the next period will cause an increasing anæmia, and must be regarded as abnormal. Such excessive loss may result from tumours of the womb or inflammation in the pelvis.

The treatment will depend on the cause but the home nurse should always advise rest in the recumbent position if the bleeding is very heavy. Bleeding from the womb is always diminished by lying down.

Menstrual Pain.—Most women are led by tradition to expect some pain during their menstrual periods. There is little doubt that the mental attitude is important, and the term "unwell" or "poorly time" is responsible for causing harm in two ways. The potentially neurotic girl will feel justified in making the most of her complaints, while the less complaining type who may suffer severely may not seek advice because after all she has been told that she must not expect to be well.

There are three different varieties of menstrual pain. These will be briefly described.

1. True menstrual pain. This is not common and probably only occurs in four to six per cent of all women. The pain is severe and colicky, occurs at the beginning of the period and usually lasts only for a few hours. Vomiting often occurs, and the face is usually very pale. Fainting is not uncommon.

The patient should be put to bed if the above severe type is encountered. A hot cup of tea, two tablets of aspirin and a hot-water bottle are common home remedies. As soon as the acute phase of the pain is over, she should get up, because exercise is beneficial. A nightly warm bath is also helpful and constipation should be checked by aperients if necessary. Unfortunately, however, these measures are sometimes inadequate; expert advice is then sought and the doctor will prescribe suitable treatment.

2. Menstrual pain due to some associated disease in the pelvis. There is increasing congestion of the whole pelvis immediately before a menstrual period. If there is inflammation of any structure such as the Fallopian tube, then the added congestion before a period will cause pain. Such patients will complain of pain of increasing intensity in the days before the period.

Treatment will naturally consist in dealing with the cause; some relief will be obtained by keeping the bowels well open in the days preceding the menstrual period.

3. Menstrual pain due to general debilitating conditions. This is by far the commonest variety of menstrual pain and is merely an exaggeration of the slight discomforts that normally accompany menstruation. The lowered state of health of the patient appears to render her still less able to withstand the strain of menstruation.

Fortunately, suitable treatment is very successful. Fresh air, tonics, exercise, iron if there is anæmia and correction of constipation, all help considerably to bring relief.

Finally, every one who suffers from menstrual pain should seek advice. The treatment will naturally depend on the cause.

Pruritus Vulvæ. By this is meant irritation of the vulva, and it may cause incalculable distress. Yet one frequently encounters women who have suffered from this distressing complaint for months and even years without daring to confide in any one. During this time much damage may have been caused to the skin by scratching. There is little doubt that scratching once started can become a habit; many of these cases start from simple causes, and the injury of scratching does not give the skin a chance to heal. This condition may also result from diabetes.

The very fact that there are a variety of causes should indicate the need for medical advice. It might be added that the cause is often trivial and readily responds to simple measures. Cleanliness is the first and chief essential. Daily baths should be taken and bicarbonate of soda may be added to the water with advantage. Drying should be thorough, but very gently carried out and should be executed by dabbing rather than by rubbing. If the irritation is caused by a vaginal discharge, a sanitary pad should be worn and this should be very frequently changed. There would be an obvious advantage in wearing an internal type of pad; this would naturally prevent any of the discharge lying in contact with the vulva.

It might be permissible for the home nurse to apply these commonsense measures herself, but if she finds no improvement after a few days, she should insist that medical advice is sought. Finally, the nurse should always warn the patient against the possible dangers and the harmful effects of scratching.

Ulcers may also occur on the vulva. They are sore places due to loss of some of the surface tissue. They may result from a variety of conditions. They always call for medical inspection because cancer may make its appearance in this way.

Treatment will naturally depend on the cause. Simple septic ulcers clear up quickly with rest in bed and frequent bathing of the ulcers. The more serious varieties require special medical or surgical treatment.

Vaginal Discharges.—A vaginal discharge is common but it is not always evidence of disease. Normally there is usually little more than is sufficient to keep the vagina moist. Sometimes, however, even in the absence of disease there is sufficient to cause the patient to seek advice. In these cases there is merely an excess of the normal, and the discharge may appear thick and milky, or it may be stringy and like the white of an egg. Discharges due to disease, on the other hand, may take varied forms. They may be thin, thick, yellowish, blood-stained, purulent, or they may have an offensive smell. All such discharges should be reported to the doctor who will investigate the cause. It will be readily appreciated that any discharge appearing at the vulva may have its origin in the vagina, mouth of the womb, the womb, the body of the womb or even in the tube. A greenish yellow vaginal discharge is one of the symptoms of the venereal disease, gonorrhœa. A similar discharge may result from other causes not at all serious but definitely requiring advice.

USING A DOUCHE

The treatment of many vaginal discharges involves the use of douches and the home nurse should therefore know how to use a douche. The nature of the fluid to be used will depend on the nature and the cause of the discharge. It may contain a mild antiseptic or it may be a weak solution of bicarbonate of soda or peroxide of hydrogen, both of which are admirable for cleansing septic discharges.

The patient should be on a bed-pan and the douche can should be one foot above the level of the bed. The temperature of the fluid in the can should be 105 to 110 degrees Fahrenheit. If it is given to supply heat, for example, in a case when there is inflammation of the Fallopian tube, then the douche may be given at a temperature of as much as 115 to 120 degrees Fahrenheit.

Having got everything ready, the nurse washes her own hands carefully, and then swabs the vaginal entrance. The labia are separated with the left hand and the lubricated nozzle is gently inserted into the vagina. Before inserting it, a little fluid is run out first in order to get rid of the air which is contained in the tube.

At least two or three pints should be employed. At the end the patient should be sat well up for a few seconds in order to empty the vagina completely. A towel should be placed under her to absorb any of the remaining fluid.

Fibroid Tumours.—These are mentioned because they are very common. There are often many in the same womb, and they may range in size from a marble to a large orange or even a football. They are not dangerous in themselves, but if they are very large, their very size may cause inconvenience and discomfort. If they bulge into the cavity of the womb, they increase the bleeding surface and naturally cause excessive bleeding.

Treatment is only necessary when the fibroids are so large that they cause inconvenience, or if they cause excessive bleeding during the menstrual period. They should be removed by operation. Again remember that this removal of the womb does not disturb the patient's general health. The bleeding may also be arrested by means of X-radiations or radium radiations which must be given in a hospital.

Cancer.—This may occur at the mouth of the womb or in the body of the womb. The former occurs most commonly in women of forty to fifty who have had several children. The first symptom is bleeding which is usually slight in amount, occurs any time and is often provoked by intercourse. The next sympton usually is a discharge which is thin, yellow and offensive. Pain does not occur until late in the disease and by this time the patient looks ill and is losing weight.

Cancer of the body of the womb again causes bleeding. It usually occurs in older women, and often in those who have had no children. The importance of reporting to the doctor any irregular bleeding is obvious.

The early reporting of symptoms that might indicate this serious disease would contribute enormously to an improvement in our results. The lay public are still unaware of the large number of people who are cured of cancer. The home nurse must therefore encourage her friends to seek medical advice when they suffer from irregular bleeding. The danger of blaming all irregularities on the "change" is a real one. Seek advice and have your mind put at rest.

The treatment again consists of operation, radium and X-rays separately or in combination.

Tubal Pregnancy.—It will be recalled that the union of the female egg and the male cell takes place in the Fallopian tube; and that immediately after union the fertilized egg begins to grow and to travel towards the womb. If this journey is hindered, the fertilized egg may become so large that it is unable to proceed further. It will then behave as it would have done if it had reached the womb. It will burrow into the lining of the tube.

Unfortunately the wall of the tube, unlike that of the womb, is thin, and its lining has not been specially prepared as was the lining of the womb. The embryo will eat its way through the entire wall and free bleeding into the abdominal cavity may result. Such a condition is very serious and demands immediate operation.

The history usually given is that the patient missed one period and then she began to have attacks of pain in the lower abdomen. There may be a slight dark discharge from the vagina as well. If a profuse hæmorrhage has occurred internally the patient suddenly collapses; the face is very pale, the pulse is frequent and difficult to feel and there is abdominal pain. Such a catastrophe, as already stated, needs immediate operation.

Inflammation of the Tube.—This is common and may be a sequel to inflammation of the womb after childbirth, or miscarriage. It may also result from gonorrhœa. The patient is nursed in bed, sitting well up. Heat may be applied to the lower abdomen by means of fomentations or hot-water bottles. Heat may also be applied internally by means of vaginal douches. As already stated, when the object of douches is to supply heat, they are usually given at a temperature of 115 to 120 degrees Fahrenheit. There is no object in using special antiseptics and it is customary to use a simple solution of common salt with one dessertspoonful in a pint of water.

After-treatment of Abdominal Operations.—During a national emergency, operations may have to be carried out at home owing to bed shortage in hospitals. It may become the home nurse's duty to look after the patient. She should be given explicit instructions which she should follow carefully.

Immediately after the operation the patient is brought back to a bed which has been well warmed with hot-water bottles. *These bottles should always be removed when the patient is returned to it.* This is because the patient is still unconscious and will therefore not be able to withdraw that part of her body which is in contact with the hot-water bottle, should it become too hot.

Burns resulting from such a happening are quite serious.

The patient should be in the horizontal position and should be turned on the side with a pillow to support the back. In this position vomiting is easier and the tongue does not tend to fall backwards and obstruct breathing as it may do when the unconscious person lies on her back. If this *should* happen, the lower jaw is pulled forward by placing the fingers behind it on either side.

When vomiting has ceased, and consciousness has been regained, the patient is placed on her back and one or more pillows supplied. Special instructions will probably be given if the patient is to be propped with several pillows. Slight changes of posture are comforting to the patient but should be carried out gently.

Vomiting usually ceases in from twelve to twenty-four hours. If it persists, bicarbonate of soda in warm water should be given freely. The strength should be one teaspoonful in about 4 oz. (8 tablespoonfuls).

Thirst may be a distressing symptom after an operation. Frequent sips of water may be given as soon as vomiting has ceased. If water cannot be retained in this way, the thirst may be relieved by the administration of saline solution into the rectum.

Pain is naturally always present after an operation, and it is now customary to administer some drug for its relief as soon as the patient complains.

DIFFICULTY IN PASSING URINE

There is often difficulty in passing urine after an operation. If the operation is an abdominal one there is a natural reluctance to use the abdominal muscles, because their contraction will draw on the wound. In addition to this it is much less easy to pass urine into a bed-pan while lying in the horizontal position.

If the operation is a vulval or vaginal one there is a fear of causing the patient pain in passing urine because of proximity of the wound.

Every encouragement should be given to the patient to try and pass it naturally. If, however, she is not able to do so after an interval of eighteen to twenty-four hours, then the catheter should be used by a professional nurse or doctor (*see* page 135). The first specimen should be kept for the medical adviser's inspection.

Diet.—Fluid food is given as soon as vomiting has ceased. For the first forty-eight hours, milk and barley water, weak tea and milk, soups and jellies and abundance of glucose and water are sufficient. After this, the diet is rapidly increased and rusks, boiled fish, stewed fruit and baked apples may be given.

Bowels.—Some flatulent distension of the intestines is common after operations and may be responsible for much pain and discomfort. If there is much distress a turpentine enema may be given on the second day. A flatus tube (a rubber tube passed six inches into the rectum) often helps the passage of wind.

An aperient is usually given on the third morning and is repeated when necessary.

Dressings and Stitches.—Full instructions are usually given regarding these. In clean abdominal operations the dressing may not need changing for several days.

The patient is usually allowed to get up between the twelfth and twentieth day, depending on the severity of the operation which she has undergone.

CHAPTER IV

NURSING OF NERVOUS DISEASES

by S. T. HAYWARD, M.B., B.S.

(*See also Part I, Chapter VIII, The Nervous System*)

THERE are many different sorts of nervous diseases but fortunately the majority of them are rare, and in this section we will only discuss those which occur relatively commonly.

Meningitis is an inflammation of the lining membranes (meninges) of the brain. It is due to an infection of them with bacteria. According to the kind of bacteria, several different sorts of meningitis are produced.

One type is cerebro-spinal fever. This illness is infectious and may occur in epidemics or as isolated cases. The infection is spread from the throat where the bacteria live and thrive, even in people who never suffer from the disease; and it is probable that the spreading is due more to these carriers than to those actually suffering from the disease. Cases tend to occur when people are living in overcrowded conditions, especially when large numbers are sleeping in dormitories or barracks with insufficient space between the beds.

The common symptoms of onset are tiredness, fever and headache. Sometimes the onset is sudden, especially in children, when it may begin with a convulsion; in adults it may start with a rigor. The headache tends to get worse and may become very intense, usually in the back of the head and upper part of the neck. At a later stage the patient complains of pain in the muscles at the back of the neck, and these are tender;

and the eyes can only stand a dim light. The patient becomes worse, his headache more intense, and mild delirium ensues. Diagnosis is made certain by removing some of the cerebro-spinal fluid for analysis, when the particular bacteria are found; this is called lumbar puncture and is quite a painless procedure. A small needle is pushed in between two of the back bones, entering the lowest part of the spinal tunnel.

TREATMENT IN MENINGITIS

Fortunately we now have a drug, M. & B. 693, which kills these bacteria, and if this drug is given in the early stages of the disease the results are excellent. The majority of cases can be more adequately nursed in hospital. The first thing is to get the patient to bed, keep him warm with hot-water bottles, if necessary, and keep the room warm and well ventilated. The headache can be relieved by cold compresses or an ice bag placed where the patient feels most pain. The room should be darkened if he complains of light. The bowels should be kept well opened, preferably with a mild aperient (what the patient is used to) and if obstinate an enema should be given.

Everything should be done quietly and the patient questioned as little as possible. Remember that he feels very ill and all he wants is that everything should be done for him. He cannot bear to be asked what he wants; therefore as far as possible try to anticipate his demands. The presence of a quiet nurse is a great help.

If the patient becomes delirious, sit quietly by the bed holding his hand or stroking his forehead; make every action smooth and gentle, and avoid all sudden movements. Remember, the patient is muddled, easily frightened by noise or any strange occurrence, and the right type of kind, gentle nursing may make all the difference in the progress of the patient.

At the onset a warm drink, whatever the patient likes best, may be given (not alcohol). During the illness fluids such as lemon or warm milk should be given frequently, and the patient may be given small amounts of easily digested solids if he asks for them.

It is rare for any one to catch this disease while nursing it; it is probable that by the time the patient gets the disease he is no longer infectious. It is wise, however, to gargle every three hours with a warm weak solution of potassium permanganate (roughly rose-coloured) as an additional precaution.

TUBERCULOUS MENINGITIS

Tuberculous meningitis is another fairly common type. Here the onset is slower, preceded by a vague period of ill-health and characterized by tiredness and loss of weight. The actual symptoms are headache, fever and vomiting, followed by pain in the muscles of the neck. After a few days the fever becomes less, the patient becomes drowsy and later comatose.

Other types of meningitis occur as complications to diseases of the ear and nose, and pneumonia. The diagnosis is made by removal of some of the cerebro-spinal fluid for analysis.

The nursing is similar to that described for cerebro-spinal fever.

A Stroke is caused by some part of the brain not gaining a sufficiently good blood supply to keep it alive, the result being that that part dies. It happens in one of two ways: either a blood vessel bursts and the blood flows straight into the brain substance, or a clot forms and blocks the blood vessel. One or other of these events is most likely to occur in older people with thickened, diseased arteries. The most common artery to be affected is the middle artery to the brain on one or the other side. The onset is often sudden (hence the name stroke), the patient loses consciousness and falls; or the onset is slower, he feels giddy, dazed and muddled, becomes weak on one side of the body, and unconsciousness supervenes. In a few cases consciousness is not lost, in others coma occurs. If the bleeding continues or the clot becomes larger coma deepens and death may result. In the majority of cases signs of returning consciousness are apparent after two or three hours; we are then able to study the extent of the damage, which will depend on the severity of the stroke. In cases of blockage of the middle artery the patient will be paralysed on the opposite side of the body; this is because the middle artery to the brain supplies blood to the response area, and this area will be damaged or destroyed as its nourishment is cut off. In milder cases there will only be partial paralysis. If the stroke is on the left side of the brain speech will be disturbed in varying degree. On the third day there is usually a rise of temperature and delirium may occur.

NURSING A STROKE

The nursing is divided into two parts. Firstly, of initial collapse; secondly, of resulting paralysis. In the first case the patient should be undressed and placed comfortably in bed as soon as possible. Breathing is frequently laboured and this may be relieved by placing the head on one side. Absolute quiet is necessary. The patient should be moved as little as possible and kept warm. On no account must any liquid be given by mouth until he has fully recovered consciousness, and then very cautiously in order to make sure that he can swallow. Liquid diet is given for the first day or two and after that a light, solid diet. Stimulants are never given and the food should be very plain. Usually the patient is kept in bed for six weeks and after that allowed to get up.

There is always a tendency in this type of paralysis for some muscles to become over taut; for instance, the fingers tend to bend and the fist to clench. If neglected, the muscles will never become straight again. The wrist and hand should, therefore, be kept flat by means of a splint (any piece of board) or, better still, with the wrist slightly tilted upwards. The foot should be kept at right angles to the leg, either by a splint or a box arranged against the foot of the bed, with a bed cradle to prevent pressure of bed-clothes. This is because the foot tends to drop, and when walking is begun the toes catch on the ground when trying to move the leg forward. All this is done in order to diminish as far as possible the ultimate deformity caused by the paralysis.

RECOVERY FROM STROKE

Massage should be begun about two or three days after the acute stage is over, very light at first. After two to three weeks the patient should be encouraged to try to move the limbs in bed, the splints being taken off two or three times daily for the purpose. The length of time the splints are required varies greatly, depending on the degree of recovery. Any recovery should be encouraged as far as possible.

Following a stroke the patient usually has loss of control over sphincters, the muscles controlling the bladder and rectum, and may have incontinence of urine and fæces. This may continue for some time, but control usually returns soon, unless the stroke is very severe. There is frequently loss of sensation as well as paralysis, so great care must be taken of the paralysed limbs to prevent them from being damaged by hot-water bottles, or the

Persistent sleeplessness, or insomnia, often accompanies or follows a nervous illness. You can help the patient at night by such simple remedies as sponging his face and hands

Give him a warm, soothing drink, and put a hot-water bottle at his feet. Then, when he is quite settled for the night, gently massage or stroke his forehead.

pressure of splints, and guard against the formation of bed-sores.

In many patients the emotions and personality are much altered after a stroke. They are apt to be peevish and extremely irritating, and family and friends should exercise much tact, sympathy and encouragement.

In **Disseminated Sclerosis** there is a patchy destruction and damage to nerve processes scattered throughout the brain and spinal cord. The symptoms are very varied and depend upon which nerve processes are destroyed. The most common symptoms are muscular weakness of a limb, coarse, jerky tremor on attempting to use the limb, and difficulty in speaking. Attacks of headache and giddiness are common. Quite frequently there is a change in the individual himself. He becomes unduly pleased with himself and frequently tends to make light of his illness. The cause of the disease is unknown. It is usually of slow onset but occasionally symptoms showing its presence arise suddenly.

If symptoms occur suddenly at any time during the illness, the patient should have ten days in bed; but apart from this he should be encouraged to be up and about, as far as possible leading a normal life. Diet is important and should be rich, nourishing and varied; these patients do best if the diet is one containing large quantities of vitamins, particularly vitamin B (*see* page 127). Light massage is good for the weak limbs, and the patient should be encouraged to take exercise as far as he is capable.

Chorea, or St. Vitus's Dance, occurs chiefly in children, and has the same cause as rheumatic fever. The symptoms are irregular movements of the muscles, which the child cannot control. The muscles involved are most commonly those of the limbs, face and tongue. The affected muscles are weak and may be almost useless.

In the acute stages absolute rest is essential. The patient must be isolated to avoid any excitement. He should not be allowed to do anything for himself and the doctor usually orders sedatives to keep him drowsy. As the condition improves, toys, books and visits are allowed for part of the day. Convalescence should be prolonged. The child should be encouraged to rest as much as possible in the open air, and take large quantities of nourishing food (*encouraged*, not forced). Special care must be exercised during convalescence, particularly if the heart has been damaged in the course of the disease, which it may be, as in rheumatic fever (*see* pages 202-205).

Cerebral Tumours arise from intense overgrowth of the cementing or protecting cells of the brain (*see* page 102) with consequent destruction of nerve cells and nerve units. Some of these tumours grow quickly; others grow more slowly and may not cause much or any trouble. The symptoms are of two kinds. Firstly, there are the symptoms due to increase of pressure within the skull. These are severe headache and vomiting, and, if the pressure becomes very great, drowsiness and then coma. Secondly, there are the symptoms resulting from destruction of nerve units; these will naturally vary according to the part of the brain where the tumour is. For instance, if the tumour occurs in the balancing part of the brain the patient will be unable to walk straight, and when turning round will tend to fall; he will not have adequate control over his limbs. There will be no actual paralysis, but clumsy and jerky movements.

The treatment is a surgical operation to remove the tumour, wherever possible. At home after the operation the patient's life should be simple and ordered, free from sudden excitements or emotional upheavals. There will probably be some change in the personality; frequently the patient is rather slow and appears more stupid than formerly. Those around him should allow for this and take care not to show irritation. They must exercise considerable patience and tact. The diet should be full, and free from stimulants. At the same time, every precaution must be taken to prevent suggestions of invalidism; the patient should be made to feel that, as far as possible, he is continuing to be a useful individual.

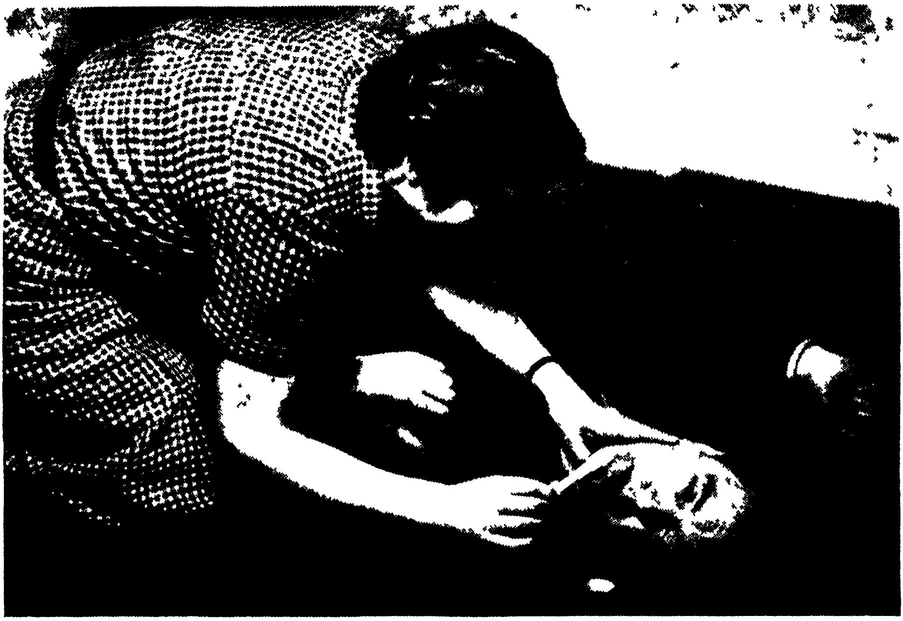
Epilepsy is a chronic disease characterized by recurring attacks of convulsions. Unfortunately we do not know the cause, but we are able to do a great deal to help these patients. The disease usually starts in childhood, and attacks may occur at frequent intervals or only occasionally. The attacks vary considerably in severity; the major ones only are convulsions proper (*see* page 111). In the minor ones there may be no loss of consciousness; the attack may consist of a dazed feeling with a vague swimming sensation in the head, the patient going pale. If he loses consciousness, he stops talking, eating or whatever he is doing for a second or two, then carries on as if nothing at all has happened.

The patient should lead a quiet, regular life. The diet should be plain and nourishing; highly spiced food, excess of salt or meat should be avoided. Particular attention should be paid to the bowels, as an attack is often precipitated by constipation. The doctor will prescribe medicine, which may be in tablet or liquid form; it is usually given first thing in the morning and last thing at night. It should be taken regularly, and the dose must never be omitted except by the doctor's instructions. The medicine is usually continued for a period of years, and even though the patient is having no attacks it is wise to go on with it.

Many sufferers from this complaint do best in the quiet ordered routine of a convalescent home specially devoted to their care. In home treatment it is important to try as far as possible to copy the quiet and restful routine of these homes.

Migraine is characterized by periodic attacks of headache, which occur on waking in the morning, and are usually accompanied by vomiting. The headache is often severe; light, noise, excitement, or even sitting up in bed, may make it much worse. The cause is unknown, but attacks are often precipitated by overwork, exhaustion, excitement, lowered bodily health, indigestion or constipation. The attacks usually last several hours and occasionally two or three days. During this time the appetite is lost and vomiting occurs at intervals when the pain is most intense.

During the attack the patient should be kept in bed in a darkened room. Aspirin helps to relieve the pain, but if it is severe the doctor will usually order something stronger. Some patients find considerable relief in cold compresses or an ice bag on the head, and others find heat, for example, a rubber hot-water bottle, preferable. The most important part of treatment is in between attacks, and the attacks can often be prevented altogether. A quiet, ordered routine of living is most important, with regular work hours, meal times and periods for sleep, and freedom from over-excitement or late nights. Every effort should be made to keep the general health as good as possible by adequate diet and suitable exercise in the fresh air. The patient should guard against indigestion and constipation.



The first thing to do in rendering treatment for a fit is to push a gag in between the teeth as shown in this photograph, to prevent the patient from biting his tongue.

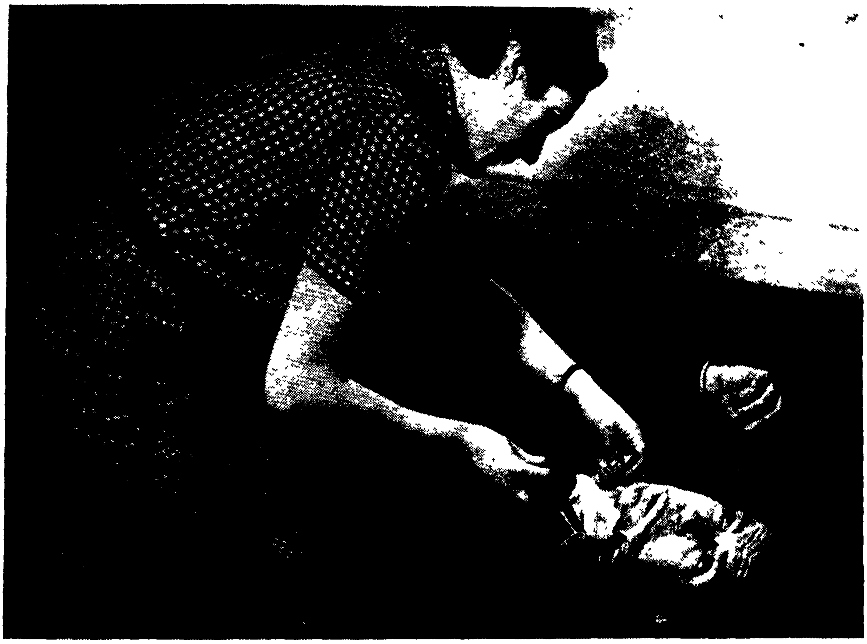
Many patients can anticipate the possibility of an attack, in which case it may be avoided by taking a laxative and a sedative the night before. The doctor will advise the most suitable ones for the purpose.

Neuritis is inflammation of a nerve. It may occur in one nerve or in many nerves at the same time. It is caused by: (1) Spread from injury or disease of surrounding tissues (2) General causes, such as poisoning by alcohol, poisoning following such an illness as diphtheria, or in any condition of lowered vitality, especially in elderly people. The symptoms vary greatly according to the cause. Pain and weakness of the muscles in the regions supplied by the affected nerves are the characteristic features in most cases.

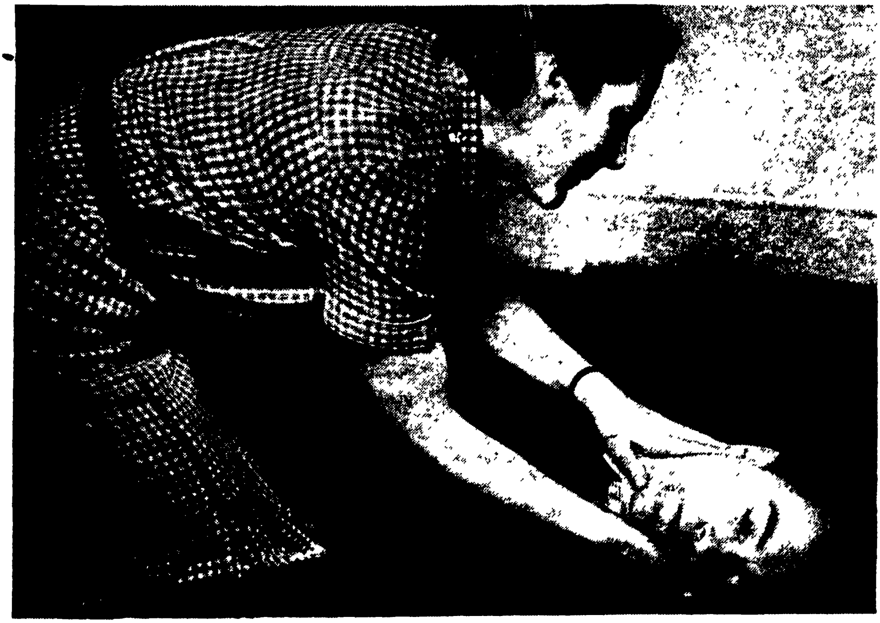
The primary disease should be treated. During the acute stages absolute rest in bed is essential. Diet should be light, nourishing and generous; stimulants must be avoided. Pain is relieved by medicine and also in most cases by heat (hot-water bottles and hot fomentations) over the affected parts. Muscles which are weak should be rested absolutely, and splints may have to be used to prevent deformities. Convalescence is often prolonged, but can be aided by plenty of good food, fresh air and the administering of massage to the weakened muscles.

DISORDERS OF THE PERSONALITY

People vary enormously. Though it is possible for two people to be so alike in their appearance that it is difficult to tell them apart, two individuals never have the same personality. When, therefore, we come to study the disorders of the personality we must realize that we can only deal with the general types of disorder. In the same way that two people are never the same in personality so disorders



The gag can be a pencil, or the handle of a spoon, quickly padded with rag or bandage. Next, loosen all tight clothing and remove any object with which he might hurt himself.



When the patient is quiet, arrange him as comfortably as possible and place his head on one side to prevent his tongue falling back into his throat and possibly choking him.

can only show similarities. What we shall attempt to do is to sketch out and explain some of the causes of disorder. We have always got to bear in mind very clearly that it is the individual who is ill, and therefore any disorder can only be thought of in terms of the actual person who is ill. In the development of these disorders certain aspects of the personality are more important than others. Probably the most important in this respect is the role of fear and anxiety. We will therefore start our account with a description of how this arises, and will go on to show how in its ramifications it can produce a great variety of symptoms.

FEAR AND ANXIETY

Fear has primarily a very important function. It occurs as the result of a situation of danger. Under the action of fear important bodily changes take place; the heart beats faster, breathing is more rapid, the muscles are tensed, and every means is taken by which the body is most fully equipped to meet the danger, that is, to be ready for either fight or flight. In civilized man, however, there are many instances when this response of fight or flight is not possible. The result is that there is an inadequate outlet for the individual's bodily changes, and it is to the resulting feelings in these conditions that the name "anxiety" is given.

I think we all realize that we can be aware of anxiety in many forms. Firstly as a vague feeling of discomfort or "sinking," or rapid beating of the heart, or rapid breathing, or as a frank feeling of anxiety in the mind. We have all experienced anxiety following a situation of danger. For example, if we are driving a car and narrowly avoid an accident, at the moment when it happens we may be perfectly calm, but a minute or two after the danger is over the heart may be beating faster, we may feel faint, or cold and clammy. These are symptoms of anxiety, only temporary in this case, and represent an over-action of the body to the situation.

ANXIETY IN THE CHILD

As human beings our childhood is fraught with much anxiety. It must of necessity be so because the human child is so entirely dependent on others, usually its mother, and even later it is dependent on adults in many ways for some years. In the beginning the child is dependent on its mother for its safety, its very life; and it is easily frightened by strange noises or events and faulty handling. The infant can only scream and wave its limbs vaguely in the air. It is incapable of either fight or flight. It suffers, in fact, from anxiety in a vague indefinite form.

As the child grows it comes to feel secure with its mother and in its immediate surroundings, while the outside world still seems full of perils and uncertainties. It is from this feeling of security in its mother that the child is gradually able to overcome its fears of the outside world. Linked with this very feeling of security there is one source of anxiety in the child which is the most difficult to deal with from the point of view of the mother. There are times when all children get into bad tempers and become angry with their parents; these times are especially frightening to the child because he feels that his mother cannot really love a child who behaves in such a way. The result is terror, sometimes in a very severe form, which can only be removed by the expression of more love from the mother. It is on how these situations of anxiety are dealt with that much of the child's future happiness and success will depend. The vast majority of people never grow out of these childish anxieties, and such manifestations as fear of the dark, of loud noises, of unknown and new things, which are typical of childhood, are also possessed by many adults.

Anxiety States.—There are quite a large number of people who all their lives are over-anxious and tend to worry over trifles. These people are likely to become ill when life is difficult, when there are obstacles in their path, when they don't seem to be getting a square deal, or a love affair goes wrong. They sometimes find normal responsibilities such as marriage or promotion in their work too much for them. They are easily upset and break down over some moral lapse, which may be to an outside observer quite a small thing. The symptoms of these breakdowns vary greatly, but they can all be understood if we remember the profound bodily changes which take place owing to fear. Indigestion, constipation, diarrhoea, rapid beating of the heart, muscular pains, heaviness of the head and headaches, are some of the most common symptoms occurring in the body as the result of anxiety. The individual who suffers in this way seldom recognizes that these symptoms are the expression of anxiety, and tends to show his anxiety by worrying over the symptoms themselves.

We have all had experience of bodily symptoms produced by anxiety; among the most common is the frequency of passing water, or diarrhoea, of a candidate just before an examination, or the rapid beating of the heart when we are awaiting an interview where we expect to be severely reprimanded. There is obviously nothing wrong with the bladder or bowels, and nothing wrong with the heart; they are purely bodily expressions of anxiety. In actual breakdowns these symptoms may persist over a considerable period of time and it is often very difficult for the patient to realize that they are the bodily expression of anxiety and not due to disease of the part in which the symptom occurs.

In the majority of these cases there is usually some anxiety of the mind itself. This may show itself by worrying about the physical symptoms, in which case they are often exaggerated and the patient is likely to take a gloomy and pessimistic view of them. For instance, he may consider that the pain round the heart is due to heart disease while in reality it is due to anxiety. In other cases anxiety of the mind shows itself in a crippling feeling of inferiority which may be of such extent as to make him unable to face and deal with the ordinary tasks of life. He cannot mix socially, and tends to become solitary and retiring. Or again the anxiety may show itself in one or more irrational fears such as a fear of open spaces, or of small rooms (claustrophobia). The number of these fears is very great; names have been given to many of them, but this is pointless as they may be anything our imaginations are able to conjure up. This type of case forms a large percentage of nervous breakdowns or just nerves. Medically these states of mind are usually spoken of as anxiety states.

Hysteria.—The name hysteria is given to a large group of personality disorders which have again a great variety of symptoms. As a whole they are characterized by an absence of anxiety. The symptoms are usually of a dramatic nature, the most common being paralysis of a limb, loss of sensation in parts of the body and hysterical fits; in addition, there may be minor emotional outbursts. These symptoms, although characterized by an absence of anxiety, are really produced as an escape from anxiety.

It appears that persons prone to suffer from this type of disorder cannot tolerate anxiety and will readily adopt any subterfuge to escape from the painful and unpleasant anxiety feeling. This is far from being deliberate, as the individual himself is quite unaware of what is happening and unable to control the process. In fact, this is so much so that the greater number of cases have never been conscious of feeling anxiety at all. Perhaps the simplest instance to illustrate this process is when a young girl is accused of making a mistake, cheating, stealing or lying. It is very common in these circumstances to see an emotional outburst in which the girl may shriek, shout and roll on the floor.

HYSTERIA AS AN ESCAPE

Thousands of cases of hysterical paralysis were seen in the army during 1914-1918; these were all produced as a response to an intolerable situation, namely fear of going back to the front line combined with a sense of duty that it must be done. As these individuals were unable to face their fear, they tended to produce some symptom to save face, and at the same time remove them from the dreaded situation. Again it must be pointed out that this process takes place entirely without the individual's awareness. In these cases of paralysis the muscles are sound, the nerves are sound, and nerve messages can be conducted along all right, but the individual is incapable of forming the nerve messages to send to the part, the result being that the part affected is paralysed and useless.

In hysterical fits the patient falls to the ground, shrieks, kicks his limbs wildly about and may tear his clothes. He remains, however, fully conscious and does not go blue in the face or bite his tongue as in convulsions or epileptic fits. They are, in fact, exaggerations of the emotional outburst described above.

It will be readily realized that in anxiety states the symptoms result from the presence of anxiety, but in hysteria the symptoms result because the patient is unable to tolerate anxiety at all and must find some method of escape from it.

Depression.—We all tend to have alternating moods; sometimes we feel joyful, pleased, and happy, at others we feel sad, "fed up" and "down in the dumps." Depression is of the same nature as this sadness, but is unduly prolonged, and the individual may not be able to rouse himself from it. He finds difficulty in concentrating, feels wretched, seems to have lost his former interests, gets easily tired and finds his work increasingly difficult to cope with. The condition varies greatly in severity; milder states are common in many of us about the time we are due for a holiday. The complications are a feeling of inferiority and hopelessness, in which the individual has a very pessimistic view of himself, tends to brood over his mistakes and feel he has neglected his family and those he loves best. Depression frequently results from some disaster such as unemployment, economic trouble, or the loss of a loved one, but at other times the cause seems to be within the individual, and frequently appears to have no relation to immediate happenings.

We have discussed the three commonest disorders of the personality, but it must be clearly realized that they do not of necessity occur as single states, but are frequently mixed, so that an individual may at the same time be depressed and also have a large number of anxiety symptoms.

In the same way an hysteric may have symptoms of an anxiety nature.

The most important thing to bear in mind the whole time in nursing individuals who are ill in this way is that it is the essential human part of the individual, as opposed to the animal body, with which we have to deal. Therefore the attitude of the nurse towards the patient is itself the most important part of treatment. The individual is humanly ill, and can only be restored to health by the understanding and sympathy of another human being. This is often difficult, because illnesses of this type may be protracted: such symptoms as irritability and quarrelsomeness are frequent, and very often it appears that the patient himself is not really trying.

KEEP "ON TOP" OF THE SITUATION

These things in themselves are enough to annoy and upset the best of us. But this is the important thing to remember; just as the patient has the power to influence us in this way, so it is for us to influence him, and so to speak, remain on the top of the situation, so that we are continually influencing him towards recovery, and not he influencing us to make us upset. We must always try to have a firm but kind, sympathetic but sensible (avoiding sloppiness) attitude towards him, doing everything to gain the patient's confidence and trust.

Many of these patients have a very poor opinion of themselves. In fact, this is so much so that if we can get them to see themselves in a better light we have often gone far towards their recovery. We should therefore take every opportunity of ministering to their self-esteem and helping them to realize that they are still useful members of the community. We want to exercise our ingenuity to find tasks the patient can do, and try and avoid pushing him to do things which are going to prove too much: simple manual hobbies are of great value in this respect. We must, however, always be on our guard against forcing the patient in any way.

GIVE THE PATIENT CONFIDENCE

It is rather like getting a fire to burn when there is latent heat in the embers, and we must coax it and encourage it until the flames really burn through. It is a question of helping, encouraging the patient to revive some interest he already has, rather than forcing a new interest on him. This is especially important in people who are depressed, for there is nothing that they find more intolerable than being pushed to do things of which they are incapable. We must have no truck with such expressions as "imaginary pains," "pull yourself together," "you've brought it on yourself," "you're playing up," "there's nothing really wrong with you," or "you'll go mad if you go on like this." These expressions are unjust and unfair, and make the patient worse, for they damage his self-esteem, which is already lowered, and our aim must always be to raise it. In exactly the same way, if a patient is anxious to do anything, no attempt at coddling or over-fussing, or doing it for him should be made, because this also will give the patient the impression that you think he is useless.

Most illnesses of this nature can be looked after at home, and the doctor will advise as to the most suitable lines of treatment in individual cases, and will also be able to deal with many of the patient's fears and troubles.

Every attempt should be made to keep the physical health as good as possible by nourishing food, regular hours and suitable exercise. The doctor will prescribe tonics in suitable cases. Certain cases will require assistance from a doctor who has specialized in psychological medicine, and in some of these a course of treatment from such a doctor may be necessary.

It must be obvious from all the foregoing that the essential treatment is of the mind, and any bodily treatment is only auxiliary.

Insanity.—Under the term insanity are classed those more serious forms of disorder of the personality in which the individual is no longer able to live a normal life within the community. One of the most common types admitted to mental hospitals is the more serious form of depression which cannot be nursed at home, and where the patient feels so miserable that he may attempt to commit suicide. These people are very deserving of our special sympathy, and with adequate treatment many of them fully recover their health.

There is another common type; those who have lost touch with the real world and live in a world created by their own fancies and imaginations, which is very similar to that which children so readily create for themselves. They are, so to speak, grown-up children who have never been able successfully to attack the problems of the real world, and have a misplaced satisfaction in making this world of their own.

Some forms of insanity are dangerous to other people at times, and special care is required in looking after them. Many other cases in a mental hospital are made up of those who are old, and are suffering from softening of the brain due to age: also there are cases due to actual disease of the brain.

It is a curious thing that bodily illness, which is so often the result of the neglect of simple hygienic rules with which most of us are familiar, is taken for granted in the community, and no one thinks any the worse of someone ill in this way; but illness of the mind, which depends on factors quite outside the sufferer's control, is still looked on in many quarters as something to be ashamed of. The same thing applies to hospitals; hospitals for treatment of the body find money available both for looking after the sick and for research work; but hospitals relieving distressed minds are a source of cheap humour and disinterest for the greater part of the community.

Fortunately modern medical science is making great strides in the understanding of these disorders; but without the sympathetic understanding of the community, progress to the benefit of mankind will be greatly delayed.

CHAPTER V

THE NURSING OF HEART DISEASES

by K. D. KEELE, M.D., M.R.C.P.

(See also Part I. Chapter IV,—Blood and the Circulation)

In Part I we very briefly described symptoms and signs which are commonly produced in heart affections, shortness of breath and œdema or swelling of the legs, the pain in the chest being the most important. There would be no point in going into the details of the many possible derangements of the circulation, and it is proposed to divide up the heart affections into groups as far as these modify their nursing or management.

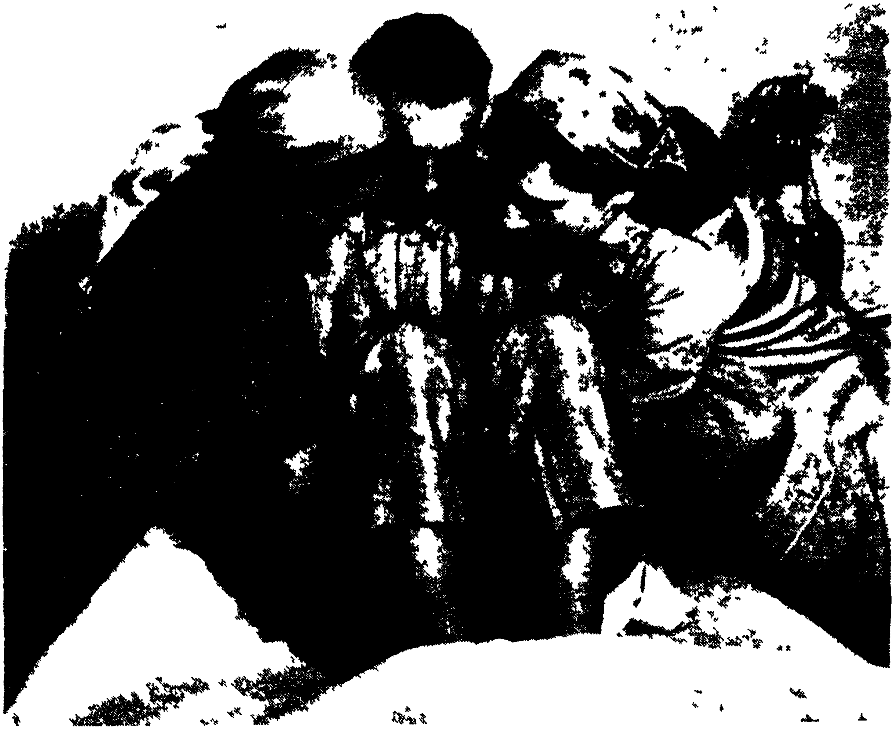
With all heart cases, however, a special point in nursing arises, with which we must deal before proceeding. As we mentioned before, there is a very natural sense of drama attached to heart troubles which at once raises a sense of anxiety both in the patient and his relations, often quite out of proportion to the facts. There are, of course, mild and severe heart affections—some which hardly shorten life at all, others which are serious: but these are as variable as affections of other organs, no more so. As a matter of fact, the heart is a particularly tough organ in the way it contrives to deal with unexpected burdens and hindrances to its quiet functioning.

Of course, if a person believes for one reason or another that he has heart disease, it is not easy for him to be convinced to the contrary. Such beliefs often occur in people who are overworked, anxious, or smoking too much, in whom palpitations, or an ache over the heart arise, probably of a perfectly harmless nature. Such symptoms, however, do also occur very often in people who have indeed true heart disease, so that their analysis must be made by a skilled doctor. The home nurse should not attempt it; she should merely know that such innocent disturbances of the heart do exist. With this reassuring knowledge the complaining person should be taken without delay for medical advice.

DEALING WITH THE PATIENT

Now it is just because people are inclined to worry about any possible heart condition that it is so important for both doctor and nurse to adopt an attitude of reasoned optimism in the management of a case. The patient will nearly always ask questions. These should always be answered truthfully within the limits of his understanding. Even if technical terms are known, they should not be used—for they are not helpful to the patient since he cannot understand them, and they are all too apt to become bogey words which frighten him. He goes and looks them up in some medical volume with an inevitable increase of his anxiety, for it is the job of a medical text book to discuss all possible developments of a complaint, some of which are invariably depressing. This group is always fastened on by the anxious inquirer, often quite unjustifiably, with the result of increased anxiety about his complaint. Such anxiety is often much less justifiable than that felt on the occasion of crossing a road in the blackout: a more dangerous occasion than many heart complaints!

From the dangers of imagination let us pass to the dangers of words. We have already mentioned technical words, but there are a few words, hardly technical, which possess a full charge of fear when heard. Angina pectoris is one term associated with sudden death by almost all people. It is a term (Latin for "gripping pain in the chest") which was introduced by a great English physician, Heberden, of the eighteenth century. He used it as a description of a certain group of heart cases which had a bad outlook, hence the origin of the ominous meaning. Since those days, in two hundred years, our knowledge of pain in the chest has advanced somewhat. Different pains have been found to have different meanings—some are harmless, some do have serious significance—but angina pectoris has been retained for the whole group, the larger part of which are the harmless ones. Now the danger of this word becomes apparent: and some doctors advocate dropping it altogether for this very reason. But it is difficult to find another,



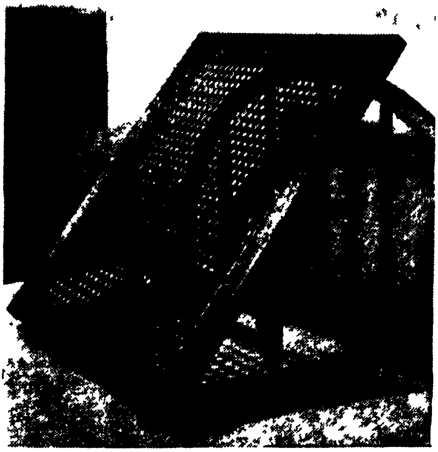
Two people are necessary to lift a patient. Let him fold his arms, then the nurses grip arms under his thighs and behind him at the base of his spine. This hold should enable them to lift a man with moderate ease as shown above.

A heart patient sitting propped up in bed supported by a bed rest which has been well padded with pillows.

and it will be a generation or so before this happens, for words are powerful over men's minds. Among other less ominous words is dropsy, which describes swelling, or œdema of the foot, also a sign which is not *by itself* necessarily serious. Heart failure is often spoken of, and does not convey the deduction of inevitable and rapid death as is sometimes thought. The heart, like the stomach, may fail to perform its function adequately for a short period, and then recover. It has, in any case, a very large reserve power.

So much for the dangerous words which hover particularly round the heart and its affections.

Various heart diseases may progress to a stage where the heart fails in its functions as a pump, with the result that blood accumulates in the veins and liver. The nursing management of such cases is of prime importance, particularly as they can be fairly often kept at home, if the doctor considers that the nursing facilities are adequate. For the sake of completeness we will consider the management of a case of considerable severity.



The photograph shows the most usual type of bed rest for ordinary home use.

Congestive Heart Failure must be treated by complete rest. This means bodily and mental rest, as far as is possible. In all details the word rest is the keynote. This, of course, means that the patient must be in bed. He must lie still. He should not feed or wash himself, nor lift himself in bed for bed-pans or any other reason. His position in bed should be changed every two to three hours with the aid of the nurse. A nurse must be with him for twenty-four hours of the day. This means a night and a day nurse are essential. These nurses will have to be physically strong enough to lift a heavy patient. To do this, both will be needed. Each bends down on opposite sides of the bed. The patient folds his arms in front of him, as shown in the illustration. Two hands are then passed under the patient's thighs and grasped, whilst the other two hands are clasped to support the back. The patient is then raised in this "chair" of arms and hands. He himself must not assist, though he will probably try to do so. Talking should be limited, apart from the patient designating his needs, etc. Conversation for pleasure with visitors must be banned—and usually this rule will result in the banning of visitors altogether.

THE CORRECT POSTURE

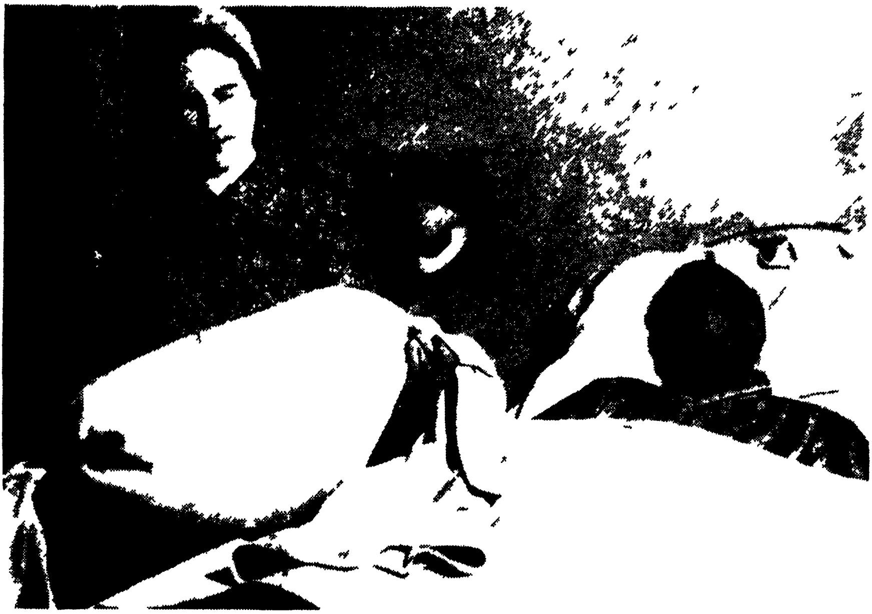
These cases will be uncomfortable if they are allowed to lie flat, so they should be supported in almost a sitting posture and kept there. This is not always an easy posture to maintain, since the passive patient tends to slip down the bed. Three measures are of great help in this problem. First, a bedded back rest against which the patient may lean, the pillows being piled up on either side so that they form a rest to the patient's arms. Special back rests with arm rest attached can be bought if the case is chronic. Secondly, a large knee pillow, made as described in the chapter on the management of a case of fever, should be used. This also prevents the buttocks from slipping down the bed. In hospitals this maintenance of the correct posture is solved by the use of a cardiac bed which is hinged so that the top piece serves as a back rest, the middle section as a rest for back and thighs, and the lowest portion supports the legs on a downward slope. The patient in this case is virtually sitting rather than lying in bed. In some cases a congestive heart case is more comfortable in a well-known old easy chair than anywhere else—and with the doctor's permission should be allowed to use it and even to sleep in it on occasion. A bed table for the patient to lean his arms on also adds greatly to his comfort if he is short of breath.

With a patient as helpless as is a severe heart case the pressure points of the body must have close observation and attention daily. It is just this type of patient who tends to lean on his elbows a lot, and so chafes them. All points, particularly back, heels and elbows, should be treated after the morning wash, with spirit and powder, the spirit being well rubbed in for several minutes to improve the circulation. The elbows may be bound up lightly with cotton wool and the heels kept off the bed by placing the legs on a pillow (*see* pages 47 and 48).

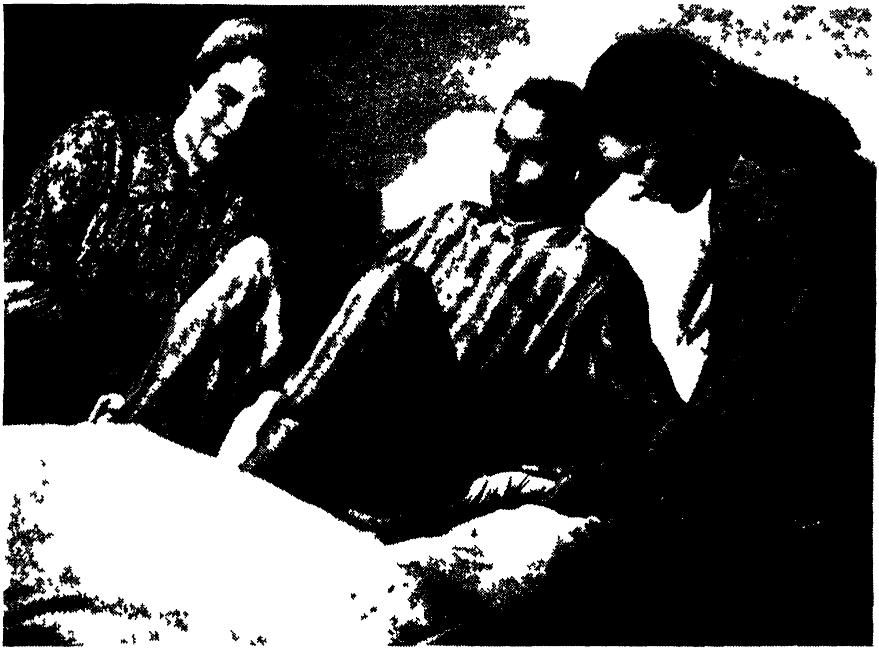
Sleep is often disturbed in this type of case, and the patient's restlessness sometimes becomes the nurse's worse trial. Since it combats the whole principle of treatment—rest—it is of the first importance to overcome it. Hours of sleep should always be carefully recorded during each twenty-four hours. The simple methods of inducing sleep mentioned previously should all be tried. The medicines necessary will be decided on by the doctor, but it may remain for the nurse to exercise her discretion as to whether the dose should be repeated. If restlessness is accompanied by distress and pain, morphia may have to be given to ensure sleep. Even this does not always produce sufficient rest.

DIET IN HEART DISEASE

The patient with congestive heart trouble has a congested lining to his stomach. This usually turns him against food. On the other hand, in spite of being, perhaps, waterlogged with the œdematous fluid in his tissues, the blood is short of liquid and the patient



A knee pillow, or "donkey," helps enormously in keeping a patient sitting up in bed Wrap an ordinary firm pillow in an old sheet as shown in the photograph above



Now with the patient sitting up, slip the pillow under his knees as shown, and tuck the twisted tails of the "donkey" firmly under the mattress on both sides of the bed may be thirsty. Fluid that is drunk produces more œdema, in spite of this thirst. A balance, therefore, has to be struck between the amount he can restrict his intake to and the minimum which he ought to have. Usually 30 oz. a day is a tolerable ration and any variation above this quantity should be permitted only with the doctor's consent. Meals should be small in quantity, and dry, fluids being taken between. By this means distressing distension of the stomach and flatulence are reduced to a minimum. There are no particular points about the diet, but each small meal should be as nourishing as possible. Bread or toast, with honey or syrup, eggs in various forms, minced chicken or meat, sugar in the fluids, should be perhaps the staple articles. But in this matter it is important to consider the likes and dislikes of the patient. Vitamins, particularly vitamin B, are important.

As the condition improves the patient will become more hungry and the diet can be increased. Muscle extracts sold as beef teas are quite useless in this type of case and should be avoided, as sugar (glucose) in fluid is of more value to the patient. And, finally, whatever diet the patient is allowed, see that it is served up attractively, even if this does mean a little extra trouble.

Pain is sometimes felt in congestive heart disease in two main places, over the heart and over the liver. It may sometimes be relieved by applying an ice bag over the painful area, or an antiphlogistine plaster. Often, however, it will be necessary for the doctor to take other measures.

These nursing procedures are the basis of the doctor's treatment of this type of heart case, because they form a technique of sustaining the strength of the patient and his heart by organized rest. Besides this, the doctor has various methods by which he can help in such cases.

Drugs which act on the heart, making

If a patient has much shortness of breath, he will find it easier to lean on a strong bed table.

Pain over the heart may, in some cases, be relieved by the application of an ice bag, as shown here.

each beat more efficient, are often given. Other drugs aid in the excretion of the fluid which is waterlogging the patient. The amount of urine passed should therefore always be measured, as it is an index of the efficiency of the circulation through the kidneys—the more urine passed the more efficient the circulation. This quantity must be compared with the amount taken in by drinks during the twenty-four hours. The drinks should always be less than the output in the urine, since in this case the fluid is being cleared out of the tissues, and in the reverse case it is accumulating—a bad sign. Sometimes after one of these drugs there is a dramatic increase in the amount of urine passed. This should cause no alarm. It is a good sign. Pursuing his design of ridding the patient of superfluous fluid, the doctor may bleed the patient from a vein in the front of the elbow, or even take some fluid out of the chest or belly. In such cases directions should be obtained from him as to what he will need for the procedure and how he would like the nurse to help him. Oxygen is sometimes administered to patients in this condition. Actually, its value is not easily assessed. Some patients are made more comfortable by it. If it is given, remember that the method of holding a funnel near the patient's nose is useless and a small tube (nasal catheter) should be placed in the patient's nose, in the manner described in the chapter on respiratory diseases.

Convalescence after an attack of congestive heart failure takes a long time, and must usually be considered a matter of months rather than weeks. It is perhaps in this stage that a home nurse will come into contact with heart cases more often than in the acute phase we have just described.

THE GOAL—A USEFUL LIFE

The whole principle of treatment here is the gradual guidance of the patient back to a *useful* life. Rest is now varied by gradual increase of exercise, the amount of exercise always being gauged by the body's response. From complete rest, the patient is gradually allowed to feed himself, then to wash, and to see visitors. He is watched to see that breathlessness does not occur whilst sitting up and doing these things.

Next comes getting out of bed, a stage very welcome to him and one during which he is very liable to do more than is good for him. At first he may get out whilst having the bed made, and perhaps to use a commode if one is available, or to go to the lavatory if this is only a few paces distant on the same floor. Later he may find his legs a bit more, and walk for a few minutes on the same floor, not climbing any stairs. Then he may walk a little and sit out of doors, being carried up and down the stairs in a carrying chair, if possible. Always the one unbreakable rule is that what is done should not produce breathlessness, pain, distress or undue fatigue. Remember that within these limits exercise for a patient with heart trouble is not only allowable but is quite definitely beneficial.

He will, however, probably never be able to undertake strenuous acts, such as running up hills, or lifting heavy weights, and should always rest in bed more than the average person. If there has been severe heart trouble such as we have described, twelve hours out of the twenty-four should be spent resting with the feet off the ground. In this may be included an hour's rest after the midday meal. In general, no exercise should be taken for at least half an hour after meals.

Diseases of the Arteries of the Heart.—In people over the age of forty heart disease is sometimes signalled by the appearance of pain in the chest, often in relation to exertion or excitement. We have already mentioned how important it is to see a good doctor if such a pain arises, as, of course, the first step in treatment is to sort out such pains, with regard to their real importance. Pains in the chest when arising from the heart vary, some being very severe. These pains often arise from the heart muscle and are associated with narrowing of the coronary arteries resulting in insufficient supply of blood to the muscle. The heart, it must be remembered, sends blood to its own walls just as it does to other organs, and in disease this supply may be cut down either gradually or suddenly as the result of blockage of a coronary artery.

THE NURSE'S DUTIES

Such a pain occurring in the chest may present the home nurse with a difficult problem. She cannot be expected to diagnose its cause—and there are many—but she can safely say to herself that with any severe pain in the chest, particularly in elderly men, there is a possibility of the heart being its origin. And in any case, the line of action which will do no harm is to get the patient into a warm bed to rest and call the doctor to him (not take the patient to the doctor). But in this case, since the diagnosis is vitally necessary, no time must be lost, and careful observation of the patient during the interval of waiting is of the first importance. The nurse should watch for: (1) restlessness, (2) the position and radiation of the pain, (3) shortness of breath, (4) signs of shock—cold, clammy skin, quick, thin pulse, (5) cyanosis, that is, blueness of lips or ears, (6) rate and rhythm of pulse, (6) vomiting.

The severest pain, perhaps, occurs with occlusion or sudden blocking of a coronary artery. Treatment of an acute pain of this type is first, rest and relief of the pain, then rest of body and heart for several weeks. After this the patient convalesces in a similar way to that described in the last section. In convalescence these patients may be even more difficult to discipline than the previous type. They have, perhaps, had only a few hours' pain (and however severe pain is, it is very rapidly forgotten) and they cannot believe that as a result they must go very easily for two months.

The home nurse's tact and restraining discipline is vital during this stage, for exertion is not safe until the muscle of the heart heals properly, which it will do with rest.

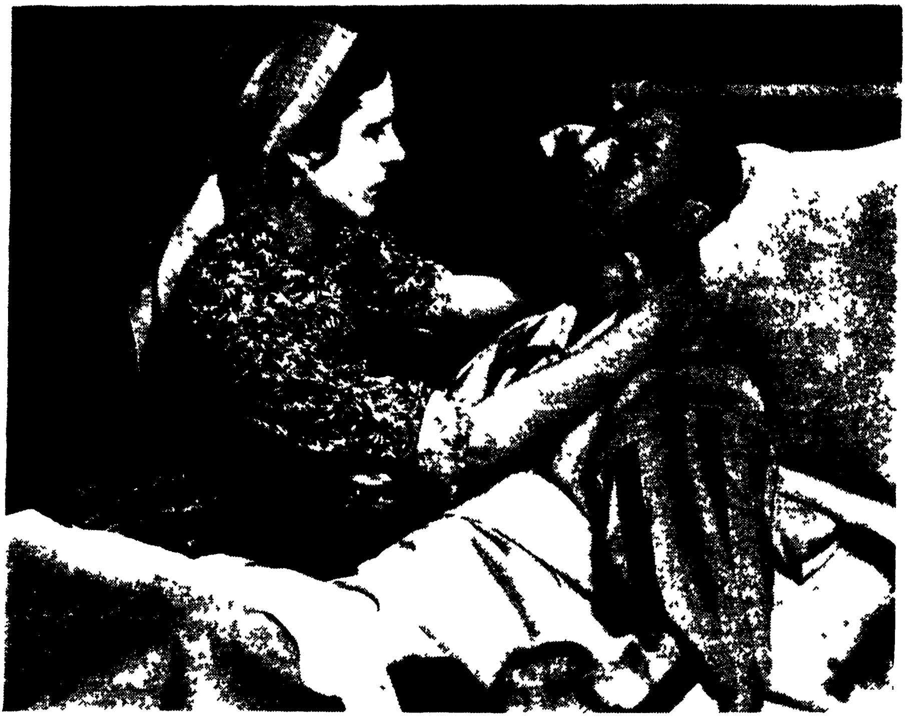
Pain on Effort in Heart Disease.—Some people get pain in the chest only when they exert themselves. They will find that the pain occurs much more easily after a big meal or on going out into the cold. Of course, walking against a strong wind or uphill also brings it on. With such types of heart pain a doctor's advice must, of course, be sought and followed. The management so far as the home nurse is concerned is the same as in the case of the convalescent patient previously described. He may take exercise which does him and his heart good, but it must be within his limits, so that no pain or shortness of breath results from the efforts he makes.

Should he get pain he should never try to walk it off, for it will then become worse. Adequate sleep and rest are also similarly graded, and similarly important. Any question of doubt should be discussed with the doctor. In general, life should be simple, healthy habits encouraged, and excitement reduced to as little as possible. The room temperature should be equable, and meals regular and small. All this may impose a considerable burden on a wife-nurse. Now and then the patient should take one or two days in bed, say one day a week, such as Sunday. If there are signs of over-fatigue and worry this is very advisable. The whole body appreciates the extra rest and afterwards can do more again without discomfort. Should the patient become a little exhausted, rest and a small amount of alcohol in the form of a light wine will often revive him; but such exhaustion indicates the need for rest in bed for some days. Life limited in exertion need never be boring or useless, although sometimes the depressed patient may think so. And a home nurse can be most helpful in quietly devising methods of interesting and occupying the patient. Many such cases are able to carry on their normal work if it is not too arduous.

Apart from a life so organized down to its smallest details, the doctor may give the patient some tablets or a capsule of amyl nitrite to carry about with him, and take as directed, for example, as soon as the pain comes on, or before some necessary but unusual effort. Inhalation of amyl nitrite should be carried out in a thorough manner (*see* CHAPTER VII, pages 94 and 95).

Pain Not Due to Heart Trouble.—So far we have been dealing with painful forms of heart disease. For every such case there are several with pains in the chest which they are afraid are due to heart disease—a very different matter! With such people the home nurse must use her many opportunities to reinforce the doctor's work in reassuring the patient. Fatigue, irritability and even shortness of breath may be prominent, but they do not necessarily signify heart disease, and firm, tactful reiteration of this fact will often convince the patient that he is not suffering from a complaint that may prove fatal.

Lastly, the question of tobacco may be mentioned. It undoubtedly produces palpitation, faintness, vomiting and distress, but it probably does not produce true heart pain in the chest. It



Palpitation can sometimes be stopped if firm pressure is applied either side of the windpipe with the thumbs as shown here. Never continue for more than a few seconds.

nevertheless predisposes to it, and should be discouraged in people who suffer from heart pain.

Palpitation is a symptom which has divers causes and mechanisms. Sometimes in nervous people there is discomfort of this sort on exertion or excitement, and the patient feels a throbbing in the chest in the region of the heart. The management is the same as that of a nervous person. The type of palpitation in which a home nurse may be able to help most is that which comes on suddenly and in which she will notice, on feeling the pulse, that it is very rapid, in spite of the fact that the patient is not exerting himself—perhaps as fast as 160 to the minute, and *regular*. Such an attack can sometimes be stopped by simple methods. Firm pressure on each side of the neck, by the side of the windpipe—not on it—for fifteen to twenty seconds may succeed. If not, try firm pressure on the eyeballs—as much as the patient can bear.

Finally, tell the patient to take a deep breath and forcibly try to breathe out against a closed glottis—that is, with the air blocked in his chest so that none flows out. If successful, the palpitation will stop at once. But it must be remembered that this would be harmful, perhaps, to a rapid, *irregular* palpitation. So if in doubt about this, put the patient to bed and await the doctor's arrival.

Heart Diseases in Children.—We have already described in Part I Chapter IV, how the heart is essentially a pump with valves. So far in this chapter we have described the management of cases where the muscular pump itself is inefficient, this inefficiency being shown by congestion or by pain and possibly by palpitation. The principles of management are in all cases similar. Some diseases affect the heart first through the valves, most commonly those on the left side—the mitral and aortic. In young people this most commonly happens as a result of rheumatic fever. This disease must be watched for by all mother-nurses. It easily evades the most careful eye, however, because it masquerades in so many disguises. It may show as a frank attack of fever, with tonsillitis (sore throat) and swollen painful joints. In such form it is unmistakable. But it occurs also as chorea (St. Vitus's Dance), or as odd pains in the limbs often called growing pains. These last are the most deceptive. Growing children do complain of pain around knees and ankles, joints which bear weight and which, as the bones grow and ligaments stretch, give twinges of pain. But this pain may represent a mild inflammation in the tissues round the joint (rheumatism), and the pain may be similar in both cases. All this may seem interesting enough, you may say, but what has it got to do with heart disease? The answer may be summed up in a sentence which says "Rheumatism in children licks the joints, but bites the heart." Here lies the importance of the mother-nurse detecting that her child has rheumatism, so that proper management shall minimise the risk of the child developing heart trouble. Rheumatic fever affects the heart only in children and young adults up to the age of about twenty-five. After this, the disease rarely

Palpitation may sometimes be stopped by pressure, as much as is bearable, on the eyeballs.

begins, though, of course, if it has started it may recur.

In the stages of activity all the heart substance is affected, the valves, the muscle and the membranous bag or pericardium. It is for this reason that such a child with rheumatism must be put to bed on absolute rest, on a regime somewhat similar to that of the congested patient described earlier. It is essential that a doctor should supervise treatment.

In this case, however, the child is usually laid flat since he is not uncomfortable in this position. To keep a child quiet in bed over a long period is a work of art requiring all nursing skill and firmness, and restraint may have to be used. In the first few years of life, lying down reins may be used, but the reins must fit accurately so that no slipping up to the neck is possible. The reins consist of two loops united in front of the child—a band passing through these loops and round the child's body, each end being fastened to the mattress, or, if they meet, buckled under the mattress. Of course, such restraint is used only if necessary, and with care: young children often lie quite quietly and comfortably in the reins and learn perhaps to do without them in time.

WARMTH AND DRYNESS

In a child with rheumatism, next in importance to rest comes warmth and dryness. He tends to sweat excessively, so nursing between blankets is advisable. Joint pain, as we have said, is not prominent and often needs no special management, and in this chapter we are concerned with rheumatism as it may affect the heart. In this, prevention is better than the cure of further attacks of rheumatism. Factors definitely known to predispose to it are dampness and poor nutrition. In delicate children, or those with a family history of rheumatic trouble, particular care should be taken concerning these two essential points.

The child's bedroom, bed-clothes, underclothing and, in fact, the whole house, should be as dry and well aired as possible.

The battle being waged against rheumatism in children is very closely linked with that of raising the physical standard of living of all people. Another point of first importance in preventing (and in managing) rheumatism, is the avoidance of infections, particularly those of nose and throat, for as we have seen, rheumatic infection often seems to get into the body along this route. It is, of course, impossible to prevent a child from getting some such trouble occasionally, and one must avoid the error of over-anxious mollycoddling of any child. But most infections are traceable to a known source, and particular care should be taken to see that a child does not play with friends with colds or slight sore throats. The child should also preferably be kept away from crowded assemblies such as cinemas.

WISE PRECAUTIONS

A cold or sore throat should not be neglected; a day or two in bed is often sensible from every point of view and should more often be adopted as the best treatment for a common cold. If the child concerned has already had an attack of rheumatic fever with some heart trouble, then these precautions are all the more indicated, with, in addition, medical supervision of the heart condition. Rheumatic disease of the heart is unfortunately not a clear-cut affair, like mumps, where there is a short sharp attack and after a week or two the whole thing is over. Rheumatism, on the contrary, grumbles on

To keep a restless child in bed, it may be necessary to use reins. They fit over the shoulders and round the chest of the child as shown, and are strapped under the mattress. With their aid, a child can be kept lying flat, or sitting up, as shown here.

over a period sometimes of months or years, though not necessarily in all cases. This long period so often makes nursing a matter of patience on both the child's and nurse's parts. Added to this there is always the risk of a flare-up of activity, often set off by a cold or sore throat, as we have mentioned. Dry warmth, good food and enduring patience are perhaps the three greatest virtues which should be studied in the management of a rheumatic child.

Congenital Heart Disease. — The heart is an intricate organ, in spite of its simple mechanism. The heart develops through many stages, from a simple muscular tube to its final four-chambered form. It is not surprising, therefore, that on some occasions this pattern is imperfect. These imperfections are various. Two main types only concern the home nurse as regards management. In one the baby is blue from early days. This is often due to a shunt of blood from one side of the heart to the other—a gross error in circulation. And the bluer a baby the more serious is the outlook. Usually, life is not prolonged under such circumstances, but quite a well-known American composer of music lived into his sixties, although he was blue all his life!

The other group are not blue. The imperfection may be discovered by the doctor whilst examining the chest as a routine. The outlook depends, of course, on what the abnormality is. But certain of these are compatible with a good, useful life. The dangers are three: (1) That the patient becomes blue later on. (2) That infection lights on the abnormal valve or heart lining. (3) That the child be turned into a neurotic invalid on account of knowing that he or she has a bad heart.

The first danger can be prevented by careful watch over the ability of the child to take exercise and preventing over exertion: the more a child can do, the more it may. It has been said that a child will never strain its heart and knows the limits of exertion better than an adult who is inclined to be obstinate about limitations. The second danger can be met along lines similar to those advocated in the care of rheumatism. The third depends upon the attitude of the mother-nurse more than anything else. Fussiness and its opposite, neglect, are the two rocks upon which fond mothers so often come to grief.

ANÆMIA

There is one complaint we are including in this chapter that does not come under the heading of heart complaints, but is due to deficiency of the blood and is known as anæmia.

We have already seen that a patient is anæmic if there is a deficiency of red blood corpuscles carrying haemoglobin. This deficiency may be due to three main causes: (1) that the blood corpuscles are not being built up in the blood factories which are situated in the marrow of the bones, (2) that the red blood cells are being destroyed in the blood, and (3) that blood is being lost by some, perhaps hidden, bleeding from a stomach ulcer, etc. Pernicious anæmia is a well-known form which received its name because it was formerly invariably fatal. In 1926 liver treatment was introduced, and the disease is now curable and no longer deserving of its name. It is a disease due to failure to supply the blood factories with essential parts, this particular essential part being formed in the stomach and stored in the liver: so that giving liver supplies the deficiency. Another essential substance in blood building is iron. If this is deficient in diet, anæmia develops.

From the home nurse's point of view the prevention of anæmia in her household consists of seeing to adequate rest, fresh air, that appetites are good and that iron-containing foods are taken in plenty. Lightly cooked liver, greens, particularly spinach and red meats are useful. These sources of iron may be supplemented by a proprietary food containing a syrup of iron phosphate. Such management might be curative for mild anæmia. But if illness is suspected medical advice should be taken since the best way to treat an anæmic person is to deal with and eliminate its cause.

CHAPTER VI

RHEUMATISM AND ARTHRITIS

by K. D. KEELE, M.D., M.R.C.P.

RHEUMATISM is a word which is used very loosely to indicate anything from an odd pain in the neck to a crippling and deforming disease of the joints. We have already described in the chapter on the management of heart affections how rheumatic fever may affect children, and how the dangers from the heart affection are greater than that from the joints.

Muscular and joint pains do occur in children; they are, however, slight in most cases, and their chief importance is as pointers towards and warning of possible heart trouble.

THREE FORMS OF RHEUMATISM

From the nursing point of view rheumatism, then, will divide itself into three forms: (1) Rheumatic fever in children; (2) muscular pains and stiffness in adults; (3) joint affections (arthritis) in adults.

Should the joints, such as knee and elbow, become painful and swollen in a child, they must be splinted and rested, for there should be a minimum of movement at the joint whilst infection is active. On the other hand, stiffness of the joint must also be avoided. This is done by putting the joint through its full movements once a day by handling it—the patient making no effort himself. In children there are hardly ever any joint deformities or stiffness after rheumatic fever, and the main emphasis is on rest. The bed-clothes should be kept from weighing on the limb by a cradle. The joint itself may be rubbed with oil of wintergreen, or antiphlogistine applied, and then wrapped in cotton wool and placed between long sandbags which splint it, or on a suitable wooden splint. In the latter case there must be adequate padding of cotton wool or flannel to stop any chafing. A plaster of paris slab is often the best splint, since it may be made to the actual shape of the limb and joint concerned. But skilled advice in splinting is necessary, as any joint must be put up in a correct position of minimum stretch to muscles and tendons, which will not be known by the home nurse.

Diet.—This should be as outlined in treatment of fevers.

STIFF JOINTS IN CHILDREN

In children, aspirin will often relieve the pain of the joint trouble very quickly and satisfactorily. If not, another medicine closely allied to it, sodium salicylate, may be ordered by the doctor to give relief. Even if there is no evidence of heart trouble, a child with acute rheumatic fever of the joints should be kept in bed for six weeks. As we have already stated, if heart trouble is present the period in bed will probably be much longer.

Should the child have infected tonsils and suffer from attacks of tonsillitis, there is no doubt that the rheumatic condition will be made worse both for joints and heart. Therefore the tonsils should be taken out when the doctor has assured himself and is perfectly satisfied that there is no activity of the disease, that is, after about three months' convalesence.

Muscular rheumatism, or fibrositis, is due to small areas of inflammation around the individual muscle fibres, so that when these are put into action in movement, pain is produced. It is not very clear what produces this reaction in the tissues around the muscle but poisons elaborated by septic infections in the body play a part; the tonsils and teeth in particular may be guilty of this. Cold and wet are well known to produce these pains and they probably act by affecting the small blood vessels in the muscle. Common forms of such rheumatism are lumbago or cricked neck. A word should be said here: pains which resemble rheumatism may be produced by disease of the internal organs. Therefore any rheumatic pain that persists or behaves unusually should be analysed by a doctor.

TREATMENT IN FIBROSITIS

Treatment in cases of fibrositis should consist of: (*a*) *Rest*. In the acute and painful stage the part must be kept at rest, movement being reduced to a minimum by lying in bed or splinting. (*b*) *Heat* should be applied, either as antiphlogistine or by friction, as in rubbing in a liniment (oil of wintergreen). (*c*) *Aspirin* taken by mouth, 10 gr. thrice in the day. These combined measures, promptly taken, will get rid of many attacks. Not one alone but all these measures are necessary to secure satisfactory results.

Heat may be applied in the home by a hot-water bottle placed on the part, but the bottle must have a cover and great care must be taken to avoid burns. Mustard and linseed poultices may be used. (Their preparation is described in CHAPTER IX.) Or if a handy person is about the house, a radiant heat can be obtained by fixing three or four electric light bulbs in a cage with a metal reflector. Gas fires provide a very soothing heat, rich in the infra-red rays that are supposed to have particular effect in relief of pain. But the form of heat decided upon will be that which can be most easily brought to the patient, with the least movement on his part. Remember it undoes a large part of the good if the patient has to struggle painfully to the source of heat, since this breaks the rule of rest to the part affected. The heat must be brought to him. Should this treatment be insufficient, injections can be made by the doctor. He should be called in to any obstinate case of rheumatism.

Lumbago is a form of rheumatism which perhaps deserves special mention. It is an inflammatory process attacking the muscles of the back. These are particularly concerned with the posture of standing, stooping down and straightening up the back from a stooping position. Thus it is usually on one of these movements that sudden pain in the back is experienced, which may be very severe. The patient suffers so much pain he can hardly move at all. He may not be able even to get up off the floor. The treatment of such a case differs in no way from that of other forms of fibrositis. Rest in this case will necessitate lying down in bed. Heat may be applied by any convenient method of those we have described. Even the old-fashioned method of a hot iron on brown paper applied up and down the back is comforting—as long as the iron is not too hot.

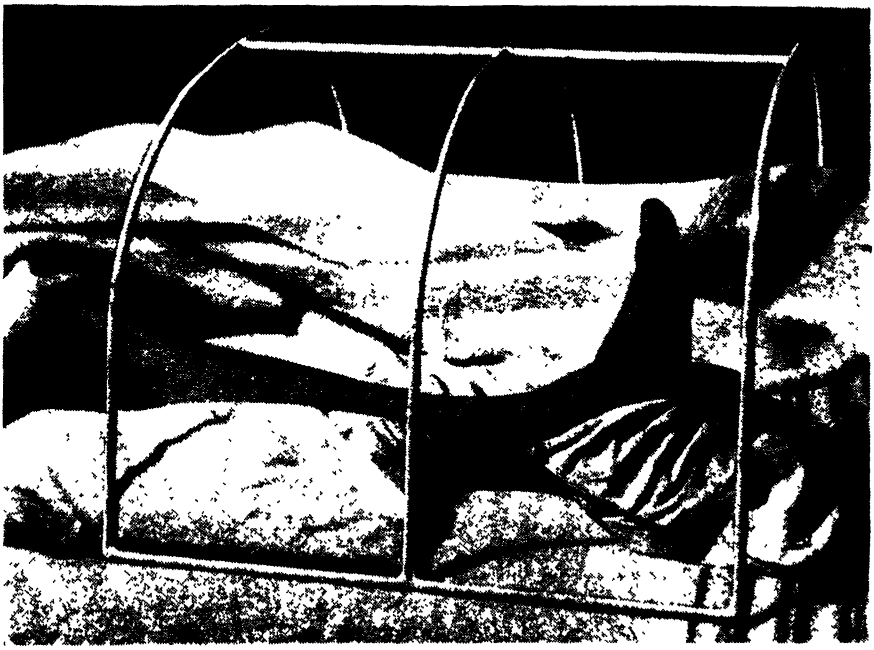
If rheumatism becomes chronic, then the first thing of importance is to banish some deeper cause of the pain. The doctor must be consulted. He will direct treatment: (*a*) to remove infection, if present in the body; (*b*) locally to the part concerned. These measures are very similar to those about to be described under our third group—arthritis.

Chronic arthritis is of two main forms. In one type the disease first affects the soft tissues round the joint; only after a considerable time is the bone and cartilage disturbed. In the second form, the disease starts in the cartilage or gristle, and only later affects the soft tissues. The first type is called rheumatoid arthritis; the second osteo-arthritis.

Rheumatoid arthritis is closely related to ordinary rheumatism, though not the same, since there is never any heart complication in rheumatoid arthritis. The trouble occurs in young adults in their twenties and thirties. It often commences in the small joints of the fingers and spreads to other joints. In management it is of the utmost importance to secure rest, of the body as a whole, and of the joints affected in particular. A doctor, of course, must supervise treatment, which is always a matter of some complexity.

Fever is high. Nutrition is of great importance and adequate vitamins are important. A search of the body, particularly teeth and tonsils, will be made in order to discover a focus of sepsis and vaccines are used.

But the home nurse herself will be most concerned with the local condition of the joints. Whilst these are acutely inflamed she will have the same problems of securing rest and relief of pain as in a case of rheumatic fever, with an important exception. Salicylates, including aspirin, are not always so effective in relieving this form of arthritis as that occurring in children. And again, whereas in children, following rheumatic fever, there is very rarely



A rheumatic leg placed between sandbags and cradled. The foot is supported by another sandbag. These sandbags can easily be made at home, and so also can a satisfactory substitute for the cradle made from wood or cane.

any residual joint trouble, in this type of adult rheumatoid arthritis there is sometimes gradual change of shape due to scarring of the soft joint tissues. This raises special problems, for the joints must be splinted and massaged, and treated by all methods at hand in order to prevent deformity occurring. This can often be done if taken in hand from the start, but once deformity has come, it is another matter to get rid of it. All affected joints should have regular and efficient treatment by trained masseurs. It is often possible to get patients away to spas, such as Droitwich or Bath, and this for rich and poor alike, arrangements being made through the hospitals. Here, under-water treatments and various skilled techniques are applied with very good results. Added to these, the routines of spa treatment are in themselves known to be very useful for their benefit on the body generally.

Rheumatoid arthritis is often a long struggle, and the home nurse who shows patience and cheerfulness, keeping a careful, watchful eye on both the joints and the patient as a person, is worth more than her weight in gold.

The other form of **osteo-arthritis** presents rather a different picture, as it occurs in elderly people, affecting most commonly such joints as the hip and knee. It is not accompanied by fever or much swelling of the soft tissues round the joint until late in its development. The management of this form is similar to that of the rheumatoid arthritis described above as far as the joints themselves are concerned. But no treatment to combat fever is necessary. Pain is very variable, not corresponding with the local severity of the disease at all, and it is remarkable how useful joints may remain even when affected over a period of some years.

CHAPTER VII

COMMON SKIN DISEASES

by K. D. KEELE, M.D., M.R.C.P.

THE skin is the armour of the human body. At first sight this may seem surprising in view of its delicacy and the ease with which it is penetrated. Heavy armour, however, of the nature of scaly plates prevents the regulation of body temperature, so necessary a function in warm-blooded animals, and to overcome this difficulty hair fur replaced the plate.

Eventually in man hair has been replaced by clothing which he takes on and off, and the elastic, supple skin remains. Skin is composed of layers of cells, as in Fig. 1. The top layer consists of dead, horny cells which are continually being shed, and replaced by more from beneath. Below this is a layer of prickle cells which are dying; below this again a pigmented layer, where lies the colouring matter of the skin so prominent in the coloured races. Beneath these is the basic layer of cells from which all the more superficial cells are derived. All these layers together form the epidermis. Beneath the epidermis lie blood vessels, nerves and fatty and elastic tissue, which give the elastic feel of skin between finger and thumb.

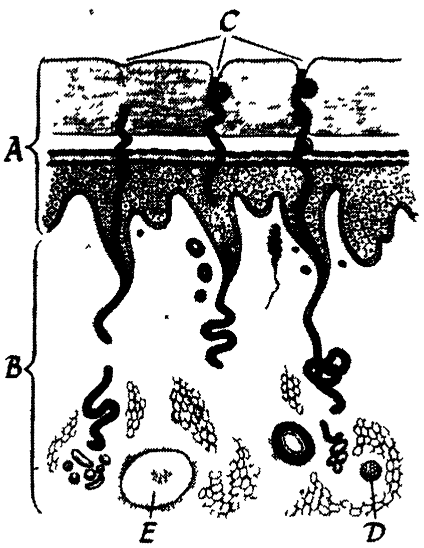


Fig. 1. *Section of skin. (A) The epidermis. (B) True skin. (C) Sweat glands. (D) Nerve. (E) Sensory end organ.*

Scattered all over the skin are the hair follicles and the sweat glands. A hair follicle consists of a sheath dipping down through the epidermis enclosing the hair, which ends at the bottom in an expansion like an onion. The hair and its follicle are richly supplied with nerves, this being the reason that the slightest touch on a hair which bends it, is felt. It also accounts for the fact that pulling out a hair is such a painful process. At the side of the hair follicle near the surface is the opening of the gland which lubricates the hair—the sebaceous gland. It is the oily secretion of these glands which keeps the hair in good condition with natural grease.

Sweat glands are little corkscrew-like glands which open out on to the surface of the skin, on to which they pour the salt fluid sweat, which, as we have seen already, by its evaporation cools the skin and blood, and so lowers the temperature of the whole body. Now diseases of the skin may commence in any of these various structures—in the blood vessels beneath, in the hair follicles, the cells of the epidermis, etc.

SKIN DISEASES

If there is an area with dilated blood vessels beneath, it turns red, in the same way as the cheeks turn red and burn when one blushes. This redness is called erythema, of which there are many forms in skin complaints. A small red spot starting like this may swell to a spot raised above the surface, called a papule. This may contain fluid and form a pustule. A blister is a collection of fluid in the cells of the epidermis alone. Sometimes the hairy cells on the surface are formed wrongly and too rapidly, so that there is an excess of them being shed; a scaly

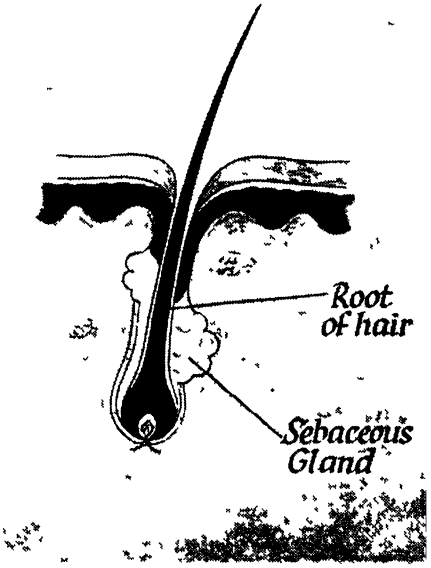


Fig. 2. *Diagrammatic representation of hair follicle as seen under the microscope.*

skin lesion is the result, as in eczema or ringworm infections.

THE ERYTHEMAS

Let us now consider some common skin complaints. Amongst the erythemas are the rashes of infectious diseases such as measles and scarlet fever. The latter rash may be mimicked quite closely by such conditions as an enema rash, or a flannel rash. Once thought of, the treatment is evident in such cases—that is, to discontinue the particular process which is causing the irritation.

Chilblains are swellings with redness, or erythema, occurring in cold weather, particularly affecting hands and feet. The burning and itching are the chief complaint.

As chilblains are due to defective circulation, prevention lies in keeping the parts warm. Thick boots and stockings and warm gloves should always be worn right from the beginning of winter by people who know themselves to be liable to chilblains. Knitting, too, is helpful, since it keeps the fingers moving and the wool is warm.

Treatment consists of keeping the chilblain covered and away from rubbing surfaces, so that the surface is not broken, for if this happens there is a liability to infection. Cover it with lint firmly applied, first dabbed over with a calamine lotion. Tablets of calcium lactate taken by mouth may be useful.

Boil.—A boil is caused by germs (staphylococci) invading the hair follicle and expanding beneath the superficial cells of the skin causing a small abscess. Eventually these superficial cells die, and the dead bacteria and cells killed by their poison slough out, forming the core of the boil. One boil tends to beget another, and the skin around is sown with germs so that crops of boils arise. They generally appear in hairy parts where the skin i chafed, such as the back of the nec near the collar in men, and in nostril and armpits. Repeated attacks of boil are sometimes associated with diabetes, but by no means always. A carbuncle is a multiple, deep-spreadin type of boil.

Fig. 3. *A diagram showing sweat glands as they would look under the microscope.*

Many general measures are used i the treatment of boils and the docto will advise you if any special treatmen is necessary. For a simple boil a paste made of magnesium sulphate and glycerine is often useful. This draws the fluid out, so relieving swelling and pain. Hot fomentations made of boracic lint are sometimes used; but the danger here is that the infection is often spread and fresh boils appear in the neighbourhood. Very dilute antiseptic, such as a weak solution of potassium permanganate in the bath may prevent recurrences. Never squeeze a boil to express the core, as this damages still further the inflamed tissues and delays healing. When it bursts the discharge should be gently wiped away with cotton wool swabs dipped in an antiseptic lotion and a fresh dressing applied. Elastic plaster dressings, especially made for the purpose and obtainable at any chemist's, are very useful for boils. If the boil is a very large and painful one or if boils keep on recurring, the doctor should be consulted, for surgical treatment, injections, a change of diet or a tonic may be indicated. The skin may be invaded by another germ, the streptococcus. Whereas the staphylococcus goes for the hair follicles, the streptococcus attacks the folds of skin, for example, behind the ears, the corners of the lips and between the buttocks.

Impetigo. This skin disease results from invasion by the streptococcus. First a little blister appears on the face. It soon breaks and gets further infected, producing a yellow crust which rapidly enlarges.

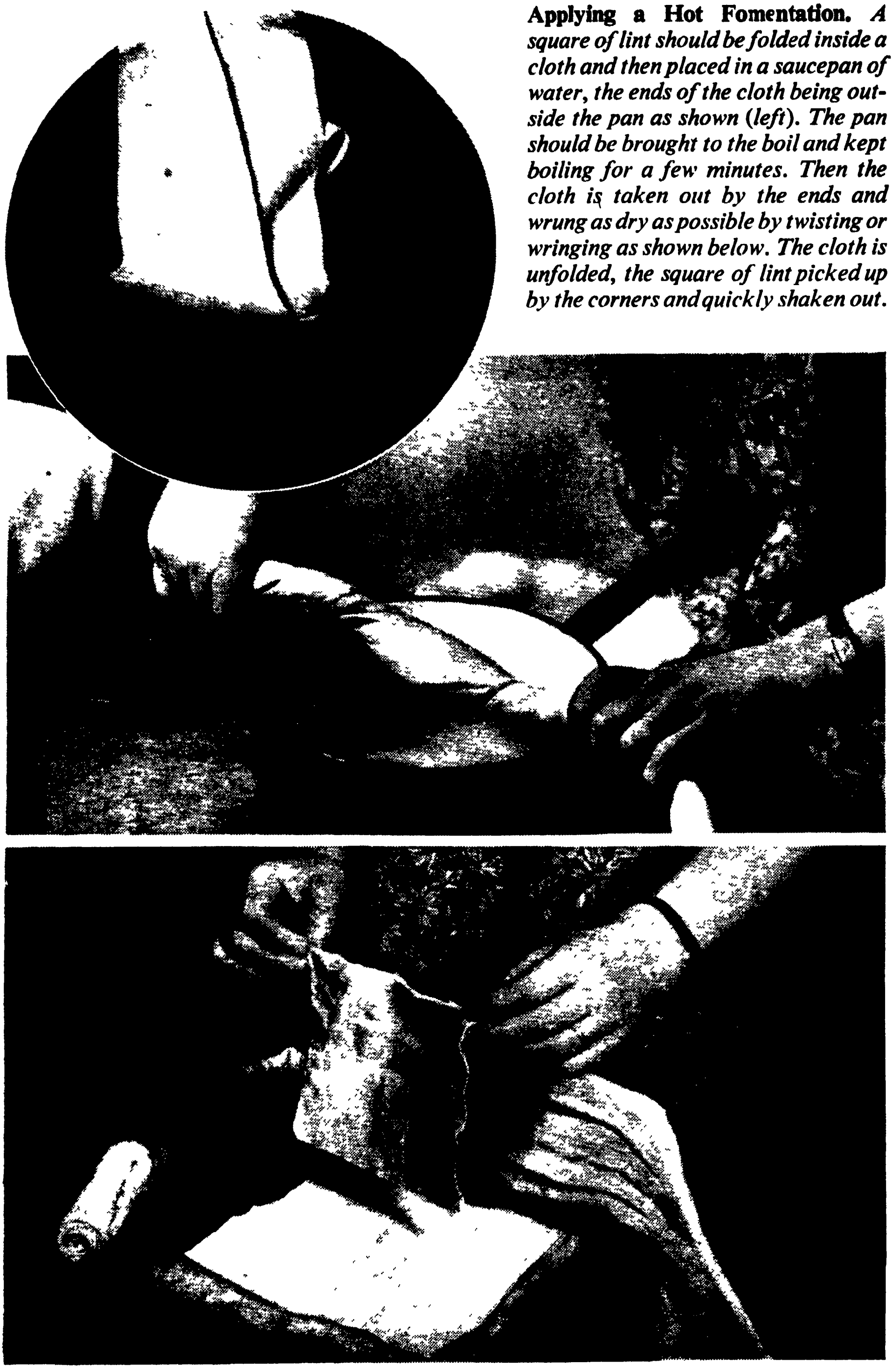
General measures, such as fresh air, sunlight and good food, are important. Since impetigo is most common in school children, isolation from school is necessary, or at least the scab should be kept permanently covered. Locally, the lesions must be kept clean—the crusts gently but thoroughly removed with hydrogen peroxide solution (dilute), after which the spots may be covered with a weak mercury ointment or painted with acriflavine, one one-thousandth in water. The child must be restrained from scratching. (*See also* COMMON AILMENTS OF CHILDREN, CHAPTER II.)

Dandruff and its complications are affections of the hair follicles. If there is too much natural grease (sebum) and it mixes with sweat, the skin becomes greasy and shiny. If the sebum gets dry and hard it mixes with the loosened superficial cells of the skin and blocks the top of the hair follicle —this is known as acne.

Common Acne.—The blackhead of this complaint is a discoloured horny plug in the mouth of the hair follicle which can be squeezed out. Acne occurs occasionally in infants, but during childhood up to adolescence it is almost unknown. At puberty it is most common and is associated with the growth to sexual maturity. These blackheads are found mostly over face, neck and shoulders, rarely in the lower half of the body. Later the blackhead may result in infection of the hair follicle by the staphylococci, so that boils arise, or a less drastic pustule may form round the root of the hair. As a result of acne the skin often becomes scarred and coarsened.

Undoubtedly there is a constitutional factor present in acne which cannot be helped. General measures of treatment include a suitable diet, that is, the restriction of starchy foods, which means cutting down to a minimum bread, potatoes, sweets and chocolates (of which these people are often too fond), pastries and cakes. All these are definitely harmful. The bowels should be regular—liquid paraffin should be enough for this. The usual rules regarding fresh air and sunlight hold. These stimulate and invigorate skin action and so improve its blood supply. Locally the skin should be kept clean with a good toilet soap and water, the blackheads expressed daily with a special expressor. The application of a sulphur paste completes each daily treatment. Any other treatment must be under the doctor's care.

Dandruff.—The scurf of dandruff consists of the outer horny cells of the



Applying a Hot Fomentation. *A square of lint should be folded inside a cloth and then placed in a saucepan of water, the ends of the cloth being outside the pan as shown (left). The pan should be brought to the boil and kept boiling for a few minutes. Then the cloth is taken out by the ends and wrung as dry as possible by twisting or wringing as shown below. The cloth is unfolded, the square of lint picked up by the corners and quickly shaken out.*

skin which are shed in excess of normal. Scurf is itself not abnormal. Every one has a certain amount of scurf, but if infection creeps into the hair follicles an excessive number of cells are formed. These may spread the irritative process to other parts of the body, such as the chest and back as well as the scalp. Later the patches may become eczematous and ooze.

In treatment of dandruff the same dietetic rules hold as for acne. Exposure to fresh air and sunshine is good if the condition is not in any way acute, but if there is infection about, hot sunshine may well start an acute increase of trouble.

Since the scalp is the seat of the trouble it must be treated even if the worst lesion is elsewhere. Regular coconut oil shampoo of the scalp, twice weekly, or more often if necessary, should be performed to keep the scalp clean. Following the shampoo, pastes or ointments should be rubbed into the whole scalp. Whitfield's ointment is a good choice, since its action is to combine disinfection with dissolving the scales. The pillow should be covered with a towel, if much ointment is used, or the head covered with a bathing cap before going to bed.

Eczema is a term describing a particular form of skin reaction to a very wide variety of irritants. It cannot therefore be called a disease in itself. The management and treatment of individual cases may in consequence be very different. The appearance of the skin varies with the stage, early or late, of this reaction. In the early phases there may be a red flush, or

Applying Hot Fomentations. *The lint square is immediately applied covered by a square of oil silk or mackintosh padded over with cotton wool, and lightly bandaged into place.*

erythema. This may pass on within a few hours to a stage of small vesicles or blisters which rapidly break, liberating their contained fluid, producing a weeping eczema. Later, when this dries, crusts and scales are formed. It will be seen from this what a variety of different appearances of the skin may be included in the term eczema.

CAUSES OF ECZEMA

The causes of eczema are equally variable. Some undoubtedly arise by contact from outside with skin irritants. Examples of these are certain chemical substances found in industry; and bacteria and fungi, besides producing infections such as we have seen, produce in some cases, particularly those that are chronic, an eczematous reaction. Some plants, particularly the primula and ivy, may produce it. But substances may be brought into contact with the skin by the blood beneath it as well as from the surface. After all, the rashes of such diseases as scarlet fever are the skin's response to blood-borne poisons, though eczema does not develop in these infectious diseases because the poison is quickly overcome and removed. Foods, particularly proteins, such as certain meats and fish, as salmon and in particular oysters, may produce eczema. But a constitutional liability to this reaction, often apparent in other members of the family, is nearly always present, sometimes shown, however, by such conditions as asthma and hay fever, which are due to a similar reaction occurring in the lining membranes of the lungs and nose.

Eczematous skin is unhealthy and so liable to infection by germs, which are always about waiting their chance to invade. Infants are particularly liable to develop eczema of the face and head. This is a serious condition if widespread, and medical advice should be sought.

To find the cause is the first step to removing it. This cause may be very elusive but must be searched for in food, plants, animals such as pets, and other contacts which the patient may have made or be making.

In the burning red and itchy weeping stages watery lotions give great relief; calamine lotion is as good as any. If the crusts and scales have formed these must be removed by soaking with a weak, warm solution of potassium permanganate (1 teaspoonful to the pint). In the stage of loose scales which flake off, pastes and cream, such as zinc cream, are useful and soothing. These should not be used in the weeping stage.

Any case of severe, acute eczema must go to bed, for rest is of great importance. The doctor must be called in, as such cases may be complicated and difficult. The patient should be encouraged to drink fluids up to five pints in the day, particularly with weeping eczemas.

Psoriasis is a scaly skin trouble which usually picks out the points of the elbows and knees, but may appear elsewhere. The scales are heaped up and silvery. The scalp may be attacked, so confusing the condition with dandruff. The cause is not known.

Various ointments are used to treat psoriasis. The matter is complex, the disease being very variable, and medical advice should be sought. Cleanliness of the skin is important. The hard scales should be removed, first being softened by soaking in olive oil or special ointment.

Urticaria is a condition in which weals develop causing great irritation. Round the weal is a flare of erythema. It is brought on sometimes by heat, after exercise, or cold, or very often as a result of eating some food, in a similar fashion to eczema. In fact, the two may be associated. Fish, eggs, pork and strawberries are common offenders in this respect.

The cause, if it can be found, is removed. Calcium lactate is given by mouth and sometimes an injection is necessary. Lead lotion or calamine lotion eases the irritation.

Children often get a papular or spotty form of this trouble which is relieved by cutting down starch and sweets in their diet and giving them a gentle laxative such as syrup of figs or a preparation of magnesia.

Ringworm is due to the growth in the skin of fungi, small organisms like yeast. There are various forms of ringworm. In children the scalp is commonly infected—a scaly, bald patch develops surrounded by fragmentary broken stumps of hair. If the mother sees this she should take the child for treatment, which is too difficult to carry out at home. The condition is infectious, so contact with other children is not advisable.

Ringworm of the skin often shows as a spreading red scaly ring. This responds to a special ointment. When using this on the body the patient should wear a special old pair of clean pants or vest to protect other clothing. The old garment can be burnt after the condition is cured.

Pediculosis.—Certain insects live on human skin. The *Pediculus capitis* lives in the head. Eggs, or nits, are laid, and are found attached to the hair. People vary in their susceptibility to these insects, some having much irritation and discomfort, others feeling little or none at all.

A close haircut is the simplest but most drastic way of getting rid of the nits. This should be followed by a daily soaking of the skin in a dilute antiseptic solution or paraffin. This soaking should last for ten minutes and be done daily for ten days.

Scabies is due to an insect which burrows into the skin where the female lays its eggs. The eggs hatch out in these burrows and the larvæ wander over the skin causing further irritation and swellings. Burrows are commonly found on the front of the wrist and between the fingers.

Treatment consists of thorough application of sulphur ointment. A bath with a good scrub should be taken first, after which the ointment is rubbed in thoroughly. The bath and ointment should be repeated for three days. Ointment can also be rubbed in each morning, making two applications in the day. After the third treatment clean clothing is put on, the dirty ones being sent for cleansing, which can be done by the local authorities. The same rule applies to bed-clothes. Beware of the skin being irritated by the sulphur ointment itself.

CHAPTER VIII

NURSING OF RESPIRATORY DISEASES

by G. T. HAYWARD, M.D., M.R.C.P.

(*See also Part I. Chapter IX. The Lungs and How We Breathe*)

THE more serious infections of the respiratory system such as bronchitis and pneumonia often follow on the colds and influenza which are so common during the winter months. It is especially important, therefore, to try to prevent people getting minor infections of the respiratory system, and if they do get them to treat them thoroughly so that more serious troubles do not follow them. By attention to the general health, the resistance of the body to infection by germs can be greatly increased, while there are some simple measures which discourage germs from causing trouble if they should happen to be breathed in.

The first important thing to avoid, if possible, is getting overtired, either mentally or physically. Fresh air and reasonable exercise build up the body resistance, while exposure to cold and wet, and particularly sitting about or working with wet feet, will lower the vitality. Hot and stuffy atmospheres are thronged with germs during the winter months if many people are present, so that if an epidemic of colds or influenza is about, it is wise to avoid going to cinemas and similar places.

Under-nourished people are much more likely to get infections than people of robust build, and so they should take extra food to get their weight back to normal. The diet should contain plenty of vitamin-containing or protective foods, such as milk, fresh fruits and vegetables, and cod liver oil and malt. Most people can take cod liver oil in this form, but if it upsets the digestion, some substitute such as vitamin tablets or capsules will supply the vitamins which are in cod liver oil.

Most of the common infections start in the nose and throat, and it helps to prevent infection if a simple gargle or throat spray is used night and morning. Glycerine of thymol or a salt and water solution (one teaspoonful of salt to a pint of water) can both be used effectively for this purpose.

The Common Cold.—A cold in the head is an infection of the lining

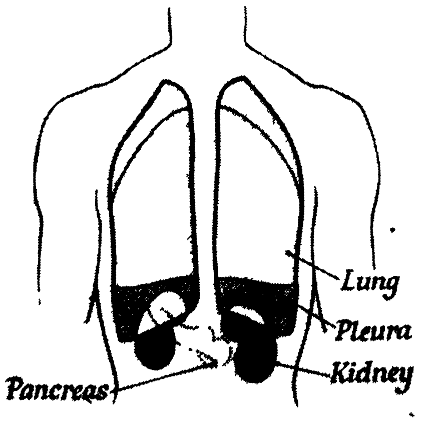


Fig. 1. *Lungs in position in the chest.*

membrane of the nose, and may spread to the throat, larynx and windpipe. The symptoms of a cold are well known to every one, for few people go through the winter without one. The first symptom is usually a feeling of stuffiness in the nose and dryness of the throat, with sometimes frequent sneezing, while there may be a slight headache. Within a few hours the condition progresses; the nose becomes stuffed up and breathing through it becomes difficult or impossible; soon a watery discharge of mucus commences, the eyes water and the patient feels hot, although the temperature is not raised. All this time he may not feel very ill and will carry on with his work. After one or two days, the discharge from the nose becomes stickier and yellowish in colour; it may then gradually disappear or may hang about for several weeks afterwards in the form of catarrh.

In severe colds, and in some patients every time they get a cold, the infection is not confined to the nose but spreads, either to the larynx and windpipe where it causes hoarseness and cough, or from the throat to the ear when deafness is liable to result.

TREATMENT OF A COLD

In the early stages of a cold, when the only symptoms are a slight stuffiness in the nose and some soreness of the throat, it may be possible to prevent a full-blown cold from developing. The patient should take a hot bath and then go straight to a warmed bed, where he has a hot drink, of lemon if possible, or orange, sweetened with sugar, to which may be added 2 tablespoonfuls of whisky. In addition, he should take two or three tablets of aspirin. Aspirin is a most valuable remedy for treating colds, and there is no real foundation for the widespread popular belief that it depresses the heart, and which stops so many people from taking it. Any brand of aspirin bought from a reputable chemist will do. The patient will perspire a little in the early part of the night after this treatment but he will often wake the next morning practically free from his cold.

If the cold is fully developed he should, in his own, and in the public interest stay at home—not necessarily in bed, but indoors where he cannot spread the infection to large numbers of people, for a cold is extremely infectious in the first few days. Looking at it from the patient's own point of view, he will recover much more quickly if he stays indoors in the warm, and there is less chance of complications developing.

The general treatment of a cold in this stage is simple. No special diet is required, but as with all infections, the patient should drink plenty to keep the kidneys working freely. Unless the temperature is raised, there is no need for him to stay in bed.

The most troublesome symptom is the running of the nose and the difficulty in breathing. Effective ways of treating this are by the inhalation of steam and vapour of friar's balsam or menthol (*see* pages 117-119) or the use of nose drops (*see* page 118). This will often clear the nose for several hours afterwards by causing a shrinking of the lining membrane of the nose. There is a portable form of inhaler which can be carried in the waistcoat pocket. It has a very powerful action in restoring nose breathing, but it should not be used more often than once in four hours as it may cause damage to the inside of the nose. Nasal douches in this stage of the cold are not good. They may cause extensions of the infection; but later, when the discharge from the nose is yellow and sticky, they may be of great help. A simple douche is made by dissolving a teaspoonful of a mixture of equal parts of salt and bicarbonate of soda in a pint of warm water and sniffing it up the nose gently into the throat. After such a nasal douche the patient should be warned not to blow his nose violently for an hour afterwards as this might force infected mucus from the throat into the inner part of the ear and cause earache. The headache and vague pains in other parts of the body are relieved by taking two tablets of aspirin three or four times a day after meals.

The catarrh which follows a cold usually lasts only for a week or so, but occasionally it may last for many weeks and sometimes months. Attention to building up the general health of the patient will help to get rid of this catarrh; some sort of local treatment for the nose, however, is usually needed as well; the best thing is the systematic use of a simple nasal douche night and morning..

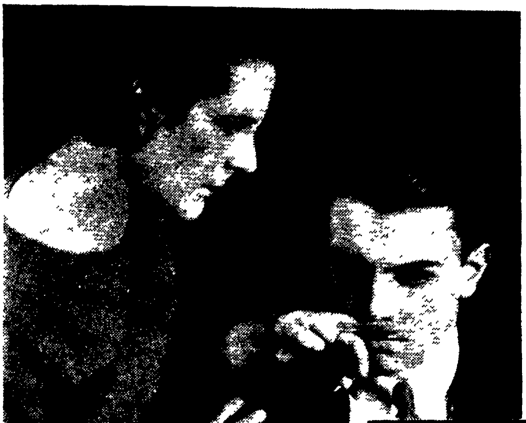
Nose Bleeding.—Nose bleeding is a very common condition, and usually it stops by itself without requiring any special treatment. In many cases it follows on a cold in the head, and is due to the lining membrane of the nose still being inflamed and then being rubbed on by the hard crusts which form just inside the nostril. The attack is usually brought on by bending the head down, say when washing the face or stooping to pick something up; blood rushes to the head and the nose starts bleeding. Other cases are due to high blood pressure, and here the nose bleeding is often a good thing as it helps to relieve the pressure.

In most cases of nose bleeding the bleeding point is situated just inside the nostril, on the partition between the two sides of the nose cavity. The nurse should remember this if she is called on to stop the bleeding. The patient often becomes alarmed if it has lasted for any length of time, and so the first thing to do is to reassure him and tell him that nose bleeding is not serious—in fact, it is frequently a good thing, the nose acting as a safety valve. The patient should be made comfortable in a sitting up position, not lying flat on his back as the blood will then trickle down into his throat and be swallowed, which irritates the stomach.

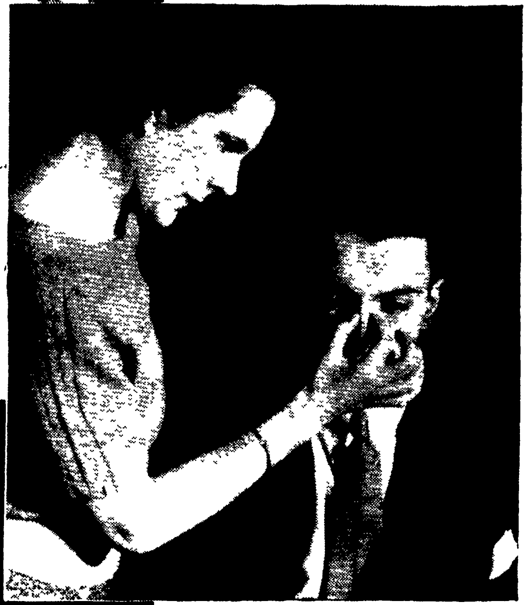
STOPPING THE BLEEDING

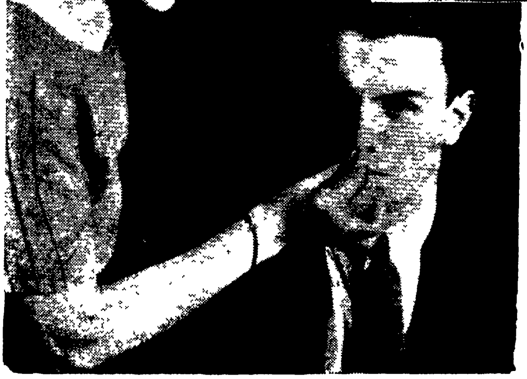
The first thing to try is pressing firmly with the finger on the upper lip; this may compress the small blood vessel which runs upwards to the bleeding point and so stop the bleeding. If it fails, then try pressing with the finger on the nostril of the bleeding side, so that it is forced inwards to press directly on the bleeding point on the nasal partition. Pressure should be maintained for two or three minutes to give the blood a chance of clotting, and the patient should not blow his nose for an hour afterwards, and then only gently. As an alternative, prepare a small plug of cotton wool about an inch and a half long and insert it for about an inch into the nostril. Then press as before on the outside of the nostril with the finger so that the wool plug is pressed against the bleeding point. Maintain pressure for about three minutes and leave the plug in position for half an hour; then remove it very gently so as not to disturb the blood clot. If these measures fail and the bleeding continues to be brisk (this very rarely happens) send for the doctor who will pack the inside of the nose with gauze. The nurse should not attempt to do this herself.

If nose bleeding occurs frequently, the patient should consult his doctor to see whether the bleeding vessel can be cauterized, or if any other form of treatment is necessary.



Nose bleeding is a common complaint which often follows on a cold. In most cases, the bleeding point is situated just inside the nostril, on the partition between the two sides of the nose cavity. If the bleeding does not stop of itself, the first thing to try is pressing firmly with the finger on the upper lip as shown in the photograph on the left.





If the first method does not succeed try using pressure on the bridge of the nose as shown in the photograph above; or with one finger on the bleeding side of the nostril. Pressure should be maintained for two or three minutes to allow for clotting. A third method is to apply pressure on the veins just inside the nostrils as shown in the photograph on left

Tonsillitis.—The tonsils are small glands situated in the throat, one on either side of the back of the tongue, and in tonsillitis they become inflamed and swollen. The chief symptom of tonsillitis is soreness of the throat, and this is made worse when the patient attempts to swallow. The disease often comes on suddenly, starting with a shivering attack, and the temperature may be raised to as much as 103 degrees. In milder cases the only complaint may be the soreness of the throat, and the temperature will not be raised more than a degree or so. The tonsils look reddened and are covered with small yellow spots which may later join up to form a yellowish sort of membrane on both tonsils. In a child such a sore throat may be the first sign of scarlet fever or diphtheria. In scarlet fever the rash comes out on the second or third day of the illness, the temperature is high and the pulse rapid. In diphtheria the child looks ill and often very pale; the temperature is not very high but the pulse is rapid and on one tonsil is a whitish yellow membrane. If there is even the slightest suspicion that the child has diphtheria the doctor must be called in at once.

TREATMENT OF TONSILLITIS

The general treatment of the patient with tonsillitis depends on the severity of the attack. If the temperature is raised, or if the neck is very swollen and there are aches and pains in different parts of the body the patient should go to bed and stay there until the temperature has been normal for forty-eight hours. If there is much sweating change the patient's night clothes frequently but take care that he does not get cold. The fresh clothes should be ready and warm, the damp ones removed and the skin rubbed with a towel before the clean things are put on.

One of the chief difficulties in nursing a patient with tonsillitis is that swallowing is so painful that he will neither drink nor take nourishment and food. One of the complications of tonsillitis is that the poisons from the throat may be absorbed into the system and upset the kidneys, so that it is most important to make the patient drink plenty of fluids (six pints daily or more) to wash these poisons out of the kidneys. Warm drinks such as tea, lemonade sweetened with glucose, barley water, soups, are all good, though the patient may have any kind of fluid that he fancies.

TREATMENT OF THE THROAT

When the throat is bad stir two tablets of aspirin into a little warm water, gargle with the mixture and then swallow it. This will often relieve the pain for several hours, and during this period the patient will swallow without difficulty. The diet should be semi-solid for the first day or so, but after that he can have any foods that he feels able to swallow. The bowels are usually constipated in tonsillitis; they should be kept open every day by giving a dose of the laxative which the patient is accustomed to taking and which will be the most likely to affect him.

The treatment of the throat itself must next be considered. Gargling with some hot fluid should be carried out frequently during the day; the heat of the fluid (and it should be as hot as can comfortably be borne) soothes the throat and helps to clear up the infection by increasing the blood flow through the tonsils. Some of the different gargles which are good are salt and water (a teaspoonful of salt to a pint of water), and also glycerine of thymol. If gargling is very painful give the aspirin gargle previously described three or four times a day. If the patient is unable to gargle, either a throat spray or a throat paint can be used. In the spray use a mixture of equal parts of hydrogen peroxide and warm water, or glycerine of thymol. For a paint the best is Mandl's paint, which can be bought at any chemist's. Paint it on both tonsils with a fine brush, but take care not to paint it on the back of the throat as it may result in making the patient sick.

If the outside of the throat is swollen and painful, a kaolin or antiphlogistine poultice (*see* pages 120 and 228-229) will be soothing. If instead of the pain subsiding in three or four days, it tends to get worse, it may mean that a quinsy (an abscess around the tonsil) is forming, and the doctor should be informed. Until he comes, carry on with sprays to the throat and hot poultices to the outside of the neck.

Laryngitis.—This condition is usually due to the extension downwards of a cold in the head. The symptoms are therefore those of a cold, which may have been present for a few days, followed by the development of hoarseness of the voice in mild cases, or in severe cases by complete loss of voice. There is usually a tickling in the throat and a troublesome cough which produces only a small amount of sticky phlegm.

The treatment is chiefly that already described for a cold, with, in addition, some other remedies to soothe the larynx. The patient with laryngitis coming on suddenly during or after a cold should always stay indoors. Rest for the larynx is important, so use the voice as little as possible. Inhalation of steam from an inhaler or bronchitis kettle (*see* pages 117 and 119) is soothing and should be carried out frequently during the day. If there is much pain in the neck, a kaolin poultice should be applied around the region of the larynx.

Under this treatment an attack of laryngitis will probably get well in a few days, but if the hoarseness of the voice persists the patient should continue with nasal douches (*see* page 118) to remove any catarrh of the nose, have an inhalation each night and use his voice as little as possible. Tobacco smoke when inhaled irritates the larynx and air passages, and so the patient with laryngitis would be well advised to give up smoking temporarily, or if this is impossible, not to inhale the smoke.

Bronchitis.—There are two chief types of bronchitis: acute bronchitis and chronic bronchitis.

- **Acute Bronchitis** is an infection of the lining membrane of the windpipe, the bronchi and their branches in the lung. It occurs in people of all ages, but is most serious in young children and old people, as there is a danger of it turning to pneumonia if it is neglected in its early stages. The chief symptom is a hard cough producing very little phlegm, which at first is very troublesome, keeping the patient awake at night. In the later stages the cough becomes looser and quite large amounts of yellowish phlegm are brought up. The temperature is usually raised for a few days, and during this time there may be some pain or soreness in the front of the chest.

In nursing patients with acute bronchitis the patient should always be kept in bed during the first few days. Adults may get up when the temperature becomes normal, but children and old people should stay in bed until the cough has disappeared. The room in which the bed is should be warmed without getting it stuffy, and the windows should be opened to get fresh air into the room without causing a draught. The diet at first should be light, milky foods being best, and the patient should be encouraged to drink plenty, especially hot drinks, as these help to loosen the phlegm and so do a good deal towards easing the cough. The bowels must be kept open.

Bronchitis patients are always relieved if they breathe air which is moistened with steam; this can be done either by the use of a bronchitis kettle, bronchitis tent or an inhaler (*see* pages 117 and 119-121), and the steam medicated with friar's balsam or oil of eucalyptus. If the cough still proves troublesome, a cough mixture will help to ease it, and the doctor will prescribe this. The cough at night is often helped by a hot drink; it can be prepared earlier in the evening and kept hot in a thermos flask which can be placed at the side of the bed. If there is soreness of the chest a linseed or kaolin poultice (*see* pages 120 and 228-229) should be applied, or if the patient does not like poultices a mustard leaf (*see* page 122) can be used, or the chest can be rubbed with a liniment such as camphorated oil.

Most cases of bronchitis will clear up with this treatment, but in very severe cases, especially in old people, the treatment described for pneumonia should be followed.

Chronic Bronchitis is most commonly seen in elderly patients. The patient may have had a previous attack of acute bronchitis, but in any case the symptoms are nearly always worse in the winter months, while during the summer the patient feels quite well. The chief symptoms are a troublesome cough, which produces a small amount of phlegm and shortness of breath. There is no rise of temperature in the ordinary way, but if the patient gets a cold the bronchitis will nearly always get worse and he should stay indoors in the warm.

The treatment of chronic bronchitis is difficult, and the chief aim should be to improve the general health and to prevent colds, as already described in the introduction to this chapter. Colds should always be treated more seriously, and it is foolish for a bronchitic person to attempt to carry on with his work until it is better. If the cough is irritating and the phlegm difficult to bring up, hot drinks and inhalations as described under acute bronchitis will be of great help, and the doctor may prescribe a cough mixture as well. The inhalation of tobacco smoke is bad and must be avoided.

Asthma is a disease in which the patient gets sudden attacks of breathlessness, usually coming on at night, which may last for several hours and then pass away leaving the patient exhausted but otherwise well. The attacks commonly first appear quite early in life and are very difficult to eradicate. The patient goes to bed feeling quite well and wakes up in the early hours of the morning with a feeling as if he is going to suffocate; he is able to breathe in fairly well, but finds breathing out so difficult that he sits up in bed, holds on to the sides of the bed and uses all his muscles to try to drive the air out of his lungs. This produces the characteristic wheezing noise. The difficulty in breathing may last for several hours and after a long attack the patient may be blue and sweating. Then he may have a bout of coughing which brings up some thick, sticky phlegm. After this is over he may feel relieved and fall asleep.

The cause of these attacks is a temporary narrowing in the size of the bronchi and their small branches which obstructs the flow of air out of the lungs.

Patients who suffer from asthma are also often subject to attacks of hay fever and eczema.

Giving an Injection (I). *Choose the site of injection, and sterilize the skin with a swab of cotton wool dipped in methylated spirit or iodine. (For full instructions see page 96.)*

Giving an Injection (II). *With the full syringe held in the right hand, the forefinger and thumb of the left hand pinches up a piece of skin, and the injection is made here.*

The nurse will usually be alone when she has to manage these attacks, and she should know that although they are very distressing to the patient and he may think he is going to die, the attacks practically always pass away, so that she should have confidence in dealing with the situation. She should arrange the pillows behind the patient's back so that they support him in the sitting position which he finds most comfortable for his breathing. Some attacks can be stopped by applying kaolin, linseed or mustard poultices to the chest; for more severe attacks, and if these recur frequently, the doctor may order an injection to be given under the skin, and this will stop the attack in a few minutes. The nurse should follow carefully the instructions given on page 96 for giving an injection, and she will be told by the doctor just how much of the solution is to be given and how often. All sorts of asthma powders can be bought; they are burned in the bedroom and the patient breathes in the fumes. Some people are greatly relieved by these powders, but only too often they irritate the chest and start a coughing attack. Do not use them without doctor's orders.

Many patients with asthma know exactly what makes the attacks come on. With some, it may be certain foods such as eggs, milk or shell-fish; with others sleeping on a feather bed, using certain brands of face powder, or emotional upsets such as quarrelling or attacks of temper; by avoiding these things they avoid the attacks. Some asthmatics get attacks after taking aspirin, so before giving this simple remedy to relieve headache or pain the nurse should inquire whether he has taken it before, and if an attack followed. If patients cannot tell what brings on the attack, it is worth while to arrange for the doctor to make tests.

Photograph showing oxygen apparatus fitted up on the face of the patient. Notice how the tubes are inserted into the nostrils.

Pneumonia is caused by germs attacking part of one or both lungs, so that instead of being like a sponge and full of air, the affected part of the lung becomes solid. Pneumonia attacks people of all ages, but it is most serious in children and old people. The attack comes on suddenly, the patient perhaps having a shivering bout, followed by the appearance of a cough which brings up a little rusty-brown phlegm, and pain in the side of the chest. The temperature rises to 103-104 degrees, the breathing becomes rapid and shallow and the patient soon becomes acutely ill. Restlessness and delirium are common in the first few days, the skin is hot and dry and a few blister sores may appear around the lips. The crisis on the seventh to the ninth day of the illness is rarely seen nowadays, because the doctor uses a drug which cuts short the disease, but if no doctor is available the disease may end in this way. The temperature falls suddenly, the pulse and breathing rate become slower, the patient sweats and then sinks into a sleep from which he wakes much improved. Convalescence after this stage of the illness is rapid.

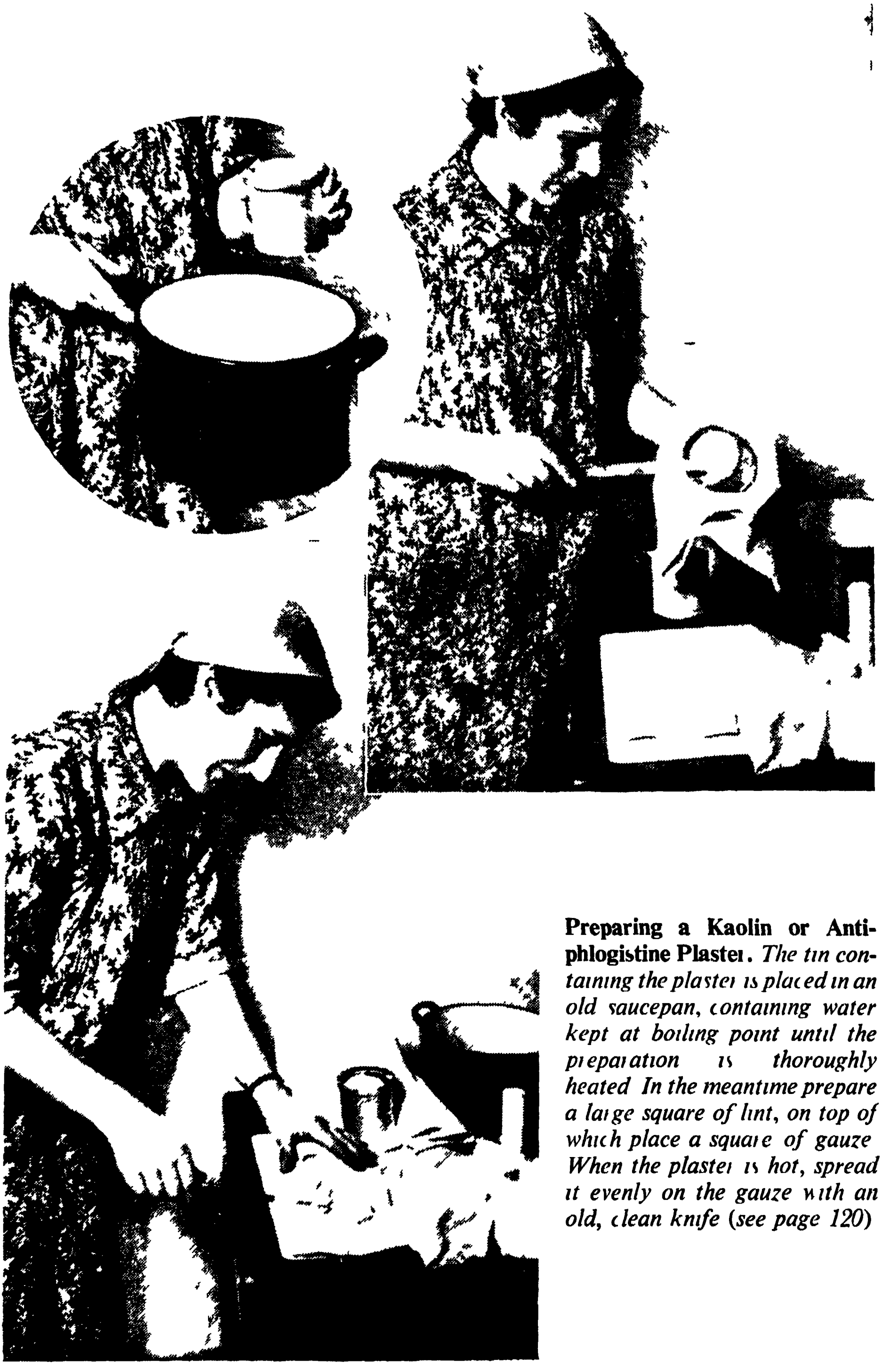
TREATMENT OF PNEUMONIA

Modern methods have shortened the duration of the illness in most cases of pneumonia, but good nursing remains as important as ever. The aim of the nurse should be to spare the patient every kind of exertion, so that all of his energy may be conserved to overcome the infection.

The patient should be nursed in a quiet, warm, airy room, situated where there will be little disturbance by other members of the household. His clothes should be wool or flannel, which can be easily removed when it is necessary to change them. Thick padded pneumonia jackets or binders are both unnecessary and harmful—they only embarrass the breathing and make the patient feel uncomfortably hot. Poultices and binders should be used only to relieve pain in the chest. During the acute stage of the illness the patient's temperature will probably vary from 102 to 104 degrees, and the skin will feel hot and dry. Tepid sponging (*see* page 45) will make the patient feel much more comfortable and helps to keep the skin in good condition, so that it should be carried out once each day, undue exposure being avoided, and each part of the body being dealt with in turn.

The diet in pneumonia should be easily digestible and a liquid or semi-solid diet is best. Large amounts should not be given at any one time. Far less strain is thrown on the digestion if small feeds are given frequently, at say two-hourly intervals during the day and when the patient is awake at night (*see* DIET FOR FEVER, Part II, CHAPTER XI). The bowels are usually constipated in pneumonia, but it is unnecessary to give purgatives for this. A simple enema (*see* page 240) every second or third day is best, and is much less disturbing to the patient than having loose motions after a purgative. Should the patient

The complete oxygen apparatus. Here the tubing and valves are supported on the face by spectacle frames. In some forms of apparatus, the rubber tubing is supported by small pieces of adhesive plaster. (For full details of using oxygen apparatus see page 122.)



Preparing a Kaolin or Antiphlogistine Plaster. *The tin containing the plaster is placed in an old saucepan, containing water kept at boiling point until the preparation is thoroughly heated In the meantime prepare a large square of lint, on top of which place a square of gauze When the plaster is hot, spread it evenly on the gauze with an old, clean knife (see page 120)*

Applying a Kaolin or Antiphlogistine Plaster. *Now quickly apply the plaster, as shown in the top photograph, and bandage lightly to hold it in place.*

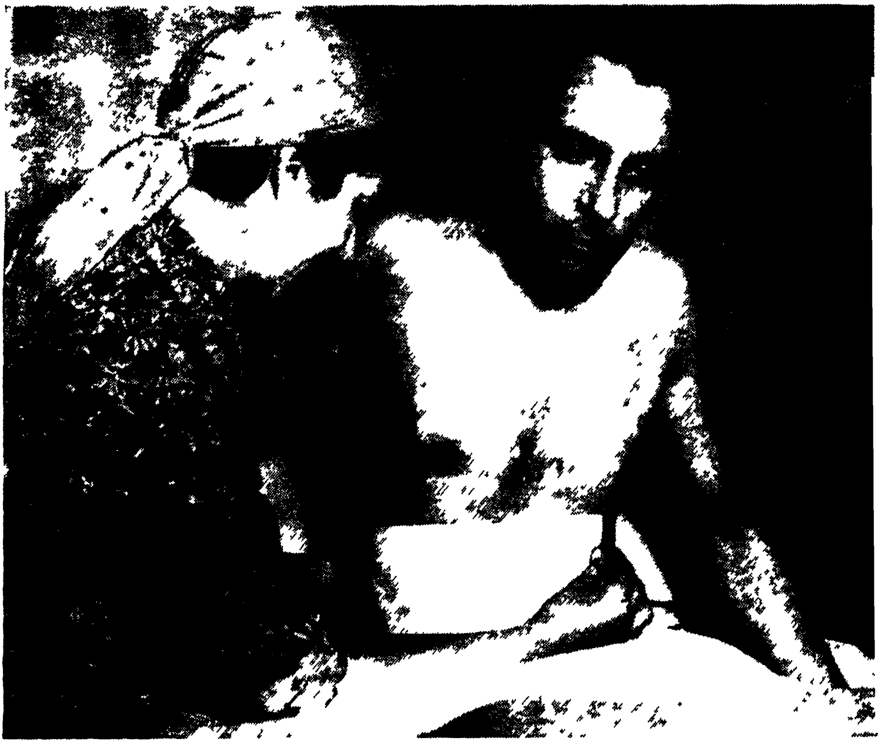
complain that he feels distended with gas in the bowel, a turpentine enema will give relief.

An adequate amount of sleep is of the utmost importance. During the first few days of the illness the patient is often restless and sleeps badly. Simple measures such as tepid sponging (*see* page 45), changing the position of the patient or giving a hot drink or two tablets of aspirin will often be effective, but if they are not, or if pain in the chest keeps the patient awake the doctor should be informed, so that he can prescribe a suitable sedative drug. The nurse should aim at getting about eight to ten hours' sleep for the patient each night.

Pain in the chest on coughing or breathing is commonly complained of and is due to pleurisy (*see* page 116). A linseed, antiphlogistine or mustard poultice generally gives great relief, but care should be taken in order not to burn the skin.

ADMINISTRATION OF OXYGEN

If the breathing becomes rapid or distressed, or if there is any blueness of the lips, ears or nails oxygen will be ordered by the doctor. If the case of pneumonia is being nursed in the house, the oxygen apparatus will be hired or sent in from a hospital. The doctor will either attend to this himself, or give you information as to how the apparatus is to be obtained. The nurse must supervise this part of the treatment.

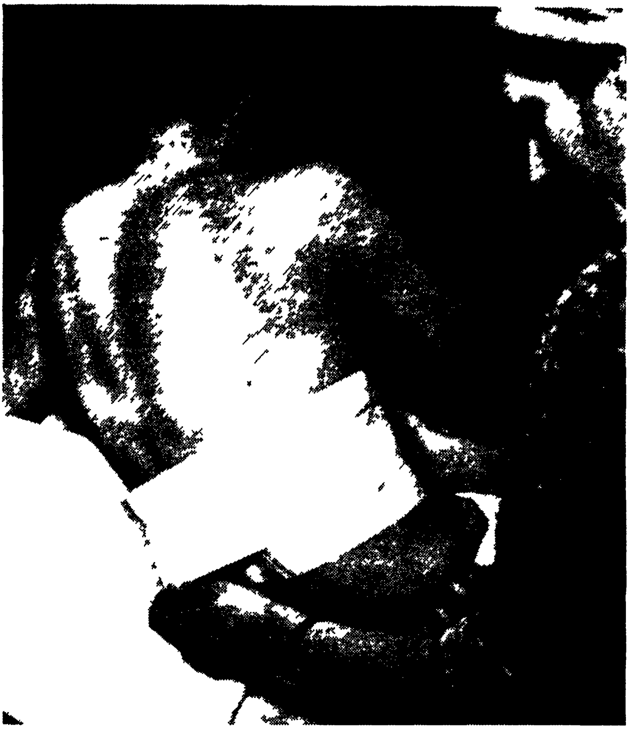


Strapping for Pleurisy. *To ease pain in pleurisy, prevent movement on the affected side by applying wide strappings of adhesive plaster. Begin at the lowest area you wish to cover.*

The method is described on pages 122 and 226-227.

Cough is often troublesome, but simple measures may give considerable relief. A bronchitis kettle, inhalation or hot drink is often helpful; if not, the doctor should be informed and he will prescribe a suitable cough medicine.

In older patients stimulants may be needed, and also they will aid sleep. Two tablespoonfuls of whisky or brandy may be taken in the twenty-four hours, this also provides an easily absorbed source of nourishment



Strapping for Pleurisy. *The second strapping should be placed above the first, and overlapping it slightly The strappings should also overlap the centre of the chest and back*

Modern drug treatment of pneumonia cures most cases, but the nurse should know that the drug used—it is called M. and B. 693 — often makes the patient feel very depressed during the course of treatment, may cause blueness of the face and may irritate the stomach and cause vomiting. These effects should be reported to the doctor, but they are not important and cease as soon as the administration of the drug is stopped.

Pleurisy.—The chief symptom of pleurisy is pain in the chest which is made worse by breathing and coughing (*see* page 116). Pleurisy is usually caused by the spread of some infection in the lung to its covering membrane the pleura, so that it is most often seen in pneumonia and tuberculosis. Sometimes it is due to an injury to the chest which fractures some ribs and these damage the pleura In some cases of pleurisy the two layers of the pleura which are rubbing together become separated by watery fluid, and many pints of this fluid may collect inside the chest. This condition is known as water on the lung, and is nearly always due to tuberculosis

The pain of pleurisy is treated by applying kaolin, mustard or linseed poultices to the affected side (*see* pages 120 and 228-229), or by strapping the chest (*see also* page 118) Other treatment depends on the cause of the pleurisy, for example, pneumonia.

Tuberculosis of the Lungs, or Consumption.—Tuberculosis of the lungs is an infection of the lungs caused by a germ The disease is contracted by the patient either breathing in air into which the germs have been coughed by another tuberculous person, by breathing in dust containing the germs, or by drinking infected milk. The first two methods are the most important, and the nurse should bear them in mind when she is looking after a patient with consumption, so that the disease is not spread to other members of the household, or to herself.

SYMPTOMS OF TUBERCULOSIS

The symptoms come on usually very gradually, and it may be many months before the patient realizes that he is ill. One of the earliest symptoms is cough; at first this is just a dry cough, but later it becomes looser, and the patient brings up a small amount of yellowish phlegm, which may be streaked with blood. Any one who coughs up blood, even if it is only a very small amount, should consult his doctor and have his lungs examined. If the disease is discovered in its early stages treatment is much more effective, and the prospects of a permanent cure much greater. Loss of appetite and loss of weight are usual symptoms, and in the advanced stages of the disease the patient may become emaciated. In the early stages he will often complain of an increasing feeling of tiredness, and at the end of the day's work will only want to sit around the house and rest. Some degree of fever is also symptomatic, and an evening temperature of 99 to 100 degrees without any obvious cause for it is very suggestive of tuberculosis. Associated with the fever, the patient will frequently have night sweats. He wakes in the early hours of the morning to find himself bathed in perspiration and his pyjamas so wet that they have to be changed. Pain in the chest may be caused by the strain of coughing or by an attack of pleurisy. In the more advanced stages there is huskiness of the voice when the disease spreads to the larynx, and pain and difficulty in swallowing.

Treatment of tuberculosis of the lungs in the home should only be carried out if for any reason it is impossible for the patient to be sent to a sanatorium or hospital. The treatment is prolonged, and even in the mildest cases will take three to six months before the patient can safely be allowed back to light work.

The most important thing in treatment is *rest*, and as long as the patient shows any rise of temperature, even to 99 degrees, he must stay at complete rest in bed. He must have a room to himself unless that is absolutely impossible. In particular, children should not sleep in the same room, as they are very susceptible. As the period of rest in bed may last several months the room should be bright and cheerful, and the room which has most sunlight should be chosen. Fresh air is important and the windows should always be open. The patient soon becomes accustomed to this, and if he feels cold give him extra bedding but do not shut the windows. When the patient starts getting up, a careful watch should be kept on the evening temperature, and if it rises it is a sure sign that he has done too much during the day.

DIET IN TUBERCULOSIS

As loss of weight is so common the diet should be a full one, and when the patient starts gaining weight it is a good sign and means that progress is being made. A full mixed diet is best, and this should contain plenty of fatty foods such as butter, cream and milk, fresh fruit and vegetables. The nurse should not force the patient to eat, but by paying attention to his likes and dislikes, she will be able to see that he gets plenty of nourishment. Cod liver oil is valuable, as in addition to being very nourishing, it contains a lot of vitamins. One tablespoonful of cod liver oil and malt taken three times a day after meals should be sufficient.

As the infection is spread by coughing, the patient must be instructed always to cough into a handkerchief, which will trap the germs. If he brings up any phlegm he can either cough into a paper handkerchief, which is burned, or else he is provided with a receptacle with a lid. The receptacle should contain an antiseptic such as a weak solution of disinfectant. The cough may be very troublesome in the early stages of treatment, but with rest and fresh air, and if the patient learns to restrain it whenever possible, it usually soon disappears. If not, the doctor will prescribe a cough mixture.

Pain in the chest, due to pleurisy or the strain of coughing, is relieved by kaolin or linseed poultices (*see* page 120) or by a mustard leaf (*see* page 122). The night sweats will disappear as the temperature settles down with rest in bed, but until then, sponging with water or eau-de-Cologne will help, and the nurse should have ready a warmed change of clothes.

The patient should not be allowed to get up until the doctor is satisfied that the infection has subsided. When he does start moving about he may feel so well that he may want to overtax his strength, and here the nurse must be firm in restraining him.

When the patient resumes his work he must pay more attention to his health than a normal person does. For several years he must avoid overtiring himself, and for the first year he should try to arrange to have an hour's rest in the middle of the day. Colds and other infections of the respiratory system should be treated promptly and the patient should stay indoors until they have quite disappeared. Any return of cough or loss of weight must be reported to the doctor.

CHAPTER IX

DISEASES OF THE DIGESTION

by F. AVERY JONES, M.D., M.R.C.P.

THE digestion of food by the stomach and intestine is an interesting and complicated process. Every part of the alimentary canal has a separate task in helping to turn food into energy or body building material. The alimentary canal consists of the mouth, the gullet or œsophagus, the stomach, the small intestine, the large intestine or colon and the rectum.

The first stage is done by the mouth, for the teeth grind the food into a fine consistency and so save the stomach from any mechanical irritation. Efficient chewing has another important effect; it mixes the salivary juices with the food and starts the process of digestion by which the food is split up into simpler chemical units which can be absorbed from the intestine and utilized by the muscles and organs of the body. Saliva is formed by three pairs of glands, two pairs lying underneath the floor of the mouth and the third pair, the parotid glands, just behind the angle of the jaw. These are the glands which become swollen and tender during an attack of mumps.

Saliva contains an enzyme, ptyalin, which breaks up starch into a simpler form, the sugar maltose. There are many enzymes concerned in the digestion of food. They are chemical substances which although present in only minute amounts, provide a link necessary for the breakdown of the larger chemical particles of food into smaller and more soluble subdivisions.

PROCESS OF SWALLOWING

Next the mouthful is swallowed; and although this seems so easy, it is quite a complicated process, for we have to prevent the food going down the windpipe. The voice box (the laryngeal cartilages) moves upwards as we swallow and close off the windpipe. At the same time breathing stops as we actually swallow. Both these facts can be readily observed in oneself. The mouthful is then gripped by the muscles of the gullet, and until it reaches the rectum we have no further consciousness of its presence. After passing down the œsophagus the food enters the stomach. Actually it is the muscular contractions of the walls of the œsophagus which propel the mouthful downwards, and it is therefore possible to swallow standing on one's head, though this is rarely necessary even in these unusual times. The stomach is a J-shaped bag with thin muscular walls which fold together when the stomach is empty, and yet can distend to hold more than three pints when full. Food remains in the stomach for one to four hours and during this time it is churned by waves of muscular contractions passing down the stomach. This mixes the food with the digestive juices which the stomach is busy secreting.

THE PYLORIC CANAL

There is a muscular ring called the pyloric canal which connects the stomach with the duodenum, the first segment of the small intestine. The small intestine when relaxed is about twenty feet long, but its normal length is somewhat shorter. When the food is churned into a fine consistency, the pyloric canal relaxes and a little gastric content is squirted into the duodenum, the same process is repeated until all the food has now passed onwards. There is practically no absorption from the stomach, though alcohol is an exception. In the duodenum the food receives the secretion of the liver, the bile, and the secretion from the pancreas, an alkaline fluid containing more enzymes. Now these, with the help of another group of chemicals produced by the body, set to work further to break down the constituents in the duodenum until protein, carbohydrates and fats are all broken down into simpler chemical units, one of which is glucose, which are readily absorbed by the intestine. The small intestine itself secretes further enzymes which help in the digestion.

The chyme, or food mixed with the digestive juices, is now propelled along the small intestine and absorption begins to take place, especially in the lower half of the intestine. There is much to be absorbed, for during twenty-four hours, in addition to the four to five pints of water extracted from food or taken as fluid, no less than twelve pints of saliva, gastric and

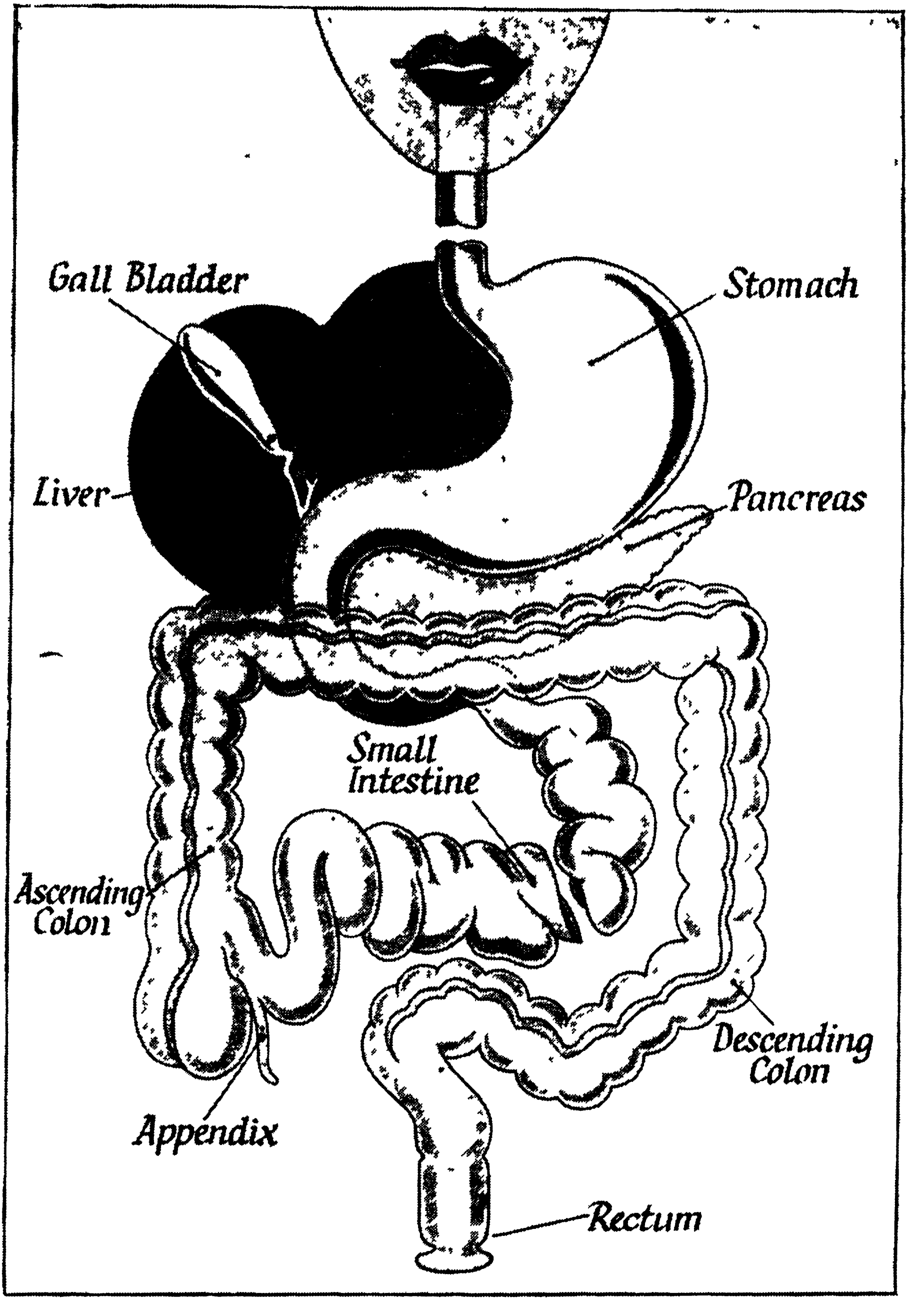


Fig. 1. *Diagram showing the digestive organs and their relative positions. Notice that there is a break in the small intestine, denoting that not all the length of this organ has been shown. The full length of the small intestine when relaxed is about twenty feet.*

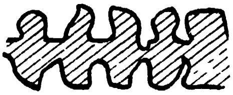
intestinal secretions have been poured into the gut. This absorption is facilitated by the many tiny projections on the lining of the gut giving it a velvety appearance and increasing its surface many-fold. It is also helped by the rhythmical local contraction of the gut which occurs, as well as the forward waves of muscular contraction.

All the veins from the small intestine pass to the liver, and here the glucose is stored as glycogen until it is needed by the muscles. Here also some of the end products of protein digestion are made non-poisonous to the system. In addition to acting as a clearing house for the final products of digestion, the liver has other important functions, including the production of bile.

WORK OF THE COLON

We are now left with the food practically fully digested and its goodness absorbed. The indigestible residue which consists of cellulose, together with some fat, and a moderate amount of water, then passes through the ileocolic sphincter into the large gut. The ileocolic sphincter is another muscular ring like the pyloric which joins the small and large intestine. It opens only three to four times a day, and then for fifteen to twenty minutes the liquid fæces pass into the large intestine. The colon passes upwards (ascending colon), then across the abdomen (transverse colon) and finally downwards (descending and pelvic colon), ending in the rectum. Only water is absorbed by the colon, and as the contents pass along the colon they gradually change into the consistency of the normal stool.

In the small intestine the contents are gradually propelled along by the muscular waves, but in the large gut the fæces move along in short rushes several times a day when the ileocolic sphincter relaxes and more arrives from the small intestine. In the colon there is considerable activity of bacteria which are normal inhabitants of the gut, and they actually form an appreciable part of the bulk of the fæces. The undigested residue from the small intestine first reaches the ascending colon four and a half hours after a meal, but does not reach the rectum for eighteen to twenty-four hours. Actually the colon is shaped like the little diagram below.



These indentations are called haustrations, which may not be emptied completely as the fæces pass along the colon, so that although the bowels are acting every day, it may actually take three to four days for the food residue of any one day to be completely cleared from the gut.

Finally, there is an accumulation of fæces in the rectum and lower end of the colon, producing a definite sensation of urge to empty the bowels.

CAUSES OF DIGESTIVE TROUBLES

The process of digestion is more complicated than the most elaborate and mechanical device in the world, and it is surprising how seldom it goes wrong even when grossly abused. There are two ways in which symptoms may arise from disorder of the alimentary tract. We may get a disturbance of function; there may be too much or too little secretion of the glands of the intestine, or muscles may be too active or too sluggish. Symptoms may also arise from a structural change caused by inflammation, tumour formation or by a mechanical difficulty.

The great majority of common digestive symptoms are due to a functional disorder. What may cause a disturbance of function? Anxiety, worry, nervous upset are certainly the commonest causes. In some people the alimentary tract is the weak spot; in others it may be the cardio-vascular system, and anxiety may then cause palpitations or fainting attacks. Even salivation may be effected by the nervous state. "His mouth was dry with fright" is a common enough phrase, and is often true.

Anxiety may upset the muscles of the œsophagus, causing a lump in the throat, or heartburn, as the result of irregular muscle contractions. It is well known that nausea and vomiting may be caused by an unpleasant sight or smell and in some nervous individuals an unpleasant experience may be reflected by the alimentary canal for many days and sometimes months or years. "Worry flies to my stomach"; "I felt my inside turn over"; "It left a horrid empty feeling" are expressions which are often used by those who have experienced an unpleasant ordeal. Again, worry, especially with a poor state of physical health, may produce bad habits in the intestine in the same way that nervous people may get twitching of the face or eyes. Air swallowing is one such bad habit and the individual develops a habit of belching, but in trying to bring up wind, much air is actually swallowed and a vicious circle is produced.

Worry is a potent cause of indigestion, for it may increase the activity of the stomach and cause excessive secretion of acid. Diarrhoea is another emotional reaction of the bowel and this is due to the over-activity of the intestinal muscle rushing the contents on too quickly. Besides nervous factors, there are other possible causes of functional derangement of the intestines. It happens in malnutrition, especially when there is a vitamin B1 deficiency in the diet; this causes poor tone of the muscles of the gut with loss of appetite and constipation. Pregnancy is another of the causes of functional disorder; nausea, vomiting and heartburn are common and sometimes troublesome complaints of the expectant mother.

It is important to have some idea of the significance of common gastro-intestinal symptoms and to know which may indicate serious disease and which will yield to early treatment.

Excessive Salivation is rare; it may be a functional disorder but the chief cause of continued excessive salivation is so-called creeping paralysis which is due to old inflammation or arterial degeneration of a small part of the brain causing general inability and stiffness of the muscles, tremor and salivation. It can be much improved by adequate treatment. Excessive salivation can also be due to soreness of the mouth or gums and it is the characteristic warning symptom of vomiting.

Dry Mouth is common in fevers but must be prevented by giving plenty of fluids. It may occur in old age without cause or when taking atropine for gastric ulceration.

Furred Tongue.—It is a great mistake to look at a tongue frequently. If you are off colour for any reason the tongue will certainly be furred. Some people examine their tongues so frequently and protrude them so far that they can see the normal rings on the back of the tongue—the circumvallate papillæ—and they get very alarmed thinking these are ulcers.

Sore Tongue should certainly be investigated by a doctor. It may be due to a simple inflammation caused by a sharp tooth, heavy smoking or unsuitable food, but it may also be an early symptom of some forms of anæmia which can be cured by simple treatment. So-called pernicious anæmia is one cause, although nowadays with regular injections of liver, anæmia rarely reaches this stage.

When there is anæmia due to an iron deficiency there may also be soreness of the corners of the mouth.

Halitosis or Bad Breath is usually due to some chronic septic focus in the mouth or nose—decayed teeth, pyorrhœa, septic tonsils or infected nasal air cells. A visit to the dentist should be the first item on the programme. If he finds nothing, then report to the doctor. With teeth, remember that prevention is better than cure, and visit your dentist regularly.

Loss of Appetite.—The causes are usually overwork, worry or a fever illness. The appetite usually returns with a short rest. If there is no such cause always get medical advice.

Difficulty in Swallowing is naturally a serious symptom and needs careful investigation. It may be due to pressure on the œsophagus or to a constriction of its lumen. Sometimes it may be produced by the failure of the muscles of the pharynx to work properly. This condition is associated with anæmia and responds readily to treatment.

Waterbrash is the sudden rush of copious, tasteless, watery fluid into the mouth due to sudden overactivity of the salivary glands; it is a common symptom with duodenal ulceration and the sufferer will require a light bland diet (*see* PART II, CHAPTER XI). It is often quite an early symptom of an ulcer, dyspepsia and early dietetic treatment may prevent further trouble.

Heartburn and Acid Regurgitation may also be symptoms associated with peptic ulcer but much more frequently they are purely functional. Worry, or too much starchy or fatty foods, may be the cause, and it is a common symptom during pregnancy.

Biliousness may describe several conditions. There is the individual who from time to time has a severe headache with spots in front of the eyes, nausea and vomiting which is known as migraine. This type of headache can nowadays be treated successfully (*see* PART II, CHAPTER XI). Then there is the person who wakes up with a dull headache, nasty taste in the mouth, no appetite for breakfast and with a conviction that life is not worth living. "A touch of the liver" is actually an accurate diagnosis; for these symptoms follow damage to the liver, especially from acute or chronic alcoholism. Such subjects may find their biliousness is aggravated by indiscretion of diet, excitement or fatigue. The remedy is simple and lies in avoiding those things which have caused the attack! Biliousness may be due to an inability to digest certain fats, and such sufferers usually know how they can avoid attacks. They are often people who have had delicate stomachs all their lives, with vomiting attacks as children, or who were sick when they travelled by train or by car. Extra sugar or glucose is valuable for such people.

Nausea and Vomiting.—Practically every acute infection, worry, excitement and fear, unsuitable food, biliousness, gastric ulcer are a few of the many causes of the sickness. There are two types of vomit which are of special significance. In gastric hæmorrhage the appearance is very like coffee grounds, for the blood has been changed in colour by the acid in the stomach.

The usual cause of gastric hæmorrhage is an ulcer, and immediate rest in bed and treatment as described later is needed. If there is copious vomiting nearly every day and food which was eaten some time previously can be recognized, it means that there is delay in the emptying of the stomach due to an obstruction, often from a duodenal ulcer; this too requires urgent treatment in hospital.

Indigestion may take various forms. There may be heartburn after meals, or flatulence which is a sense of tightness across the abdomen as a desire to bring up wind, or there may be a definite gnawing pain after meals. Flatulence may be due to inflammation of the stomach (chronic gastritis), inflammation of the gall-bladder, intolerance of starchy food or to a functional disturbance due to anxiety or hurried meals, and insufficient mastication. Some drugs such as aspirin upset the stomach, and this is often an unrecognized cause of indigestion. A definite gnawing pain across the upper part of the stomach usually means a gastric or duodenal ulcer, but gastritis may sometimes cause pain and so may an acute emotional disturbance. If indigestion does not respond to simple dietetic treatment, obtain medical advice. Any one over forty-five should have a medical overhaul even if there is a prompt response to treatment.

Irregular Abdominal Pain not related to Meals.—Probably the commonest cause is spasm of the colon due to the abuse of purgatives. Some individuals are unable to digest adequately root vegetables and starchy foods which cause undue fermentation in the gut and abdominal distress.

Colic.—If one eats coarse foods on an empty stomach—green apples, coconut, monkey nuts and so on—they may form a hard mass in the small intestine to which the gut will take violent exception. It will try to squeeze them downwards, and this spasm causes pain. Colicky pain in the stomach and sickness may also be due to appendicitis. Severe colic may occur in the loins due to a stone in the kidney, or in the right upper abdomen, going through to the shoulder blades, from gall stones. Both renal and gall bladder colic may be exceptionally severe and require an injection of morphia. Any sudden onset of colicky, abdominal pain and sickness in healthy folk calls for urgent medical advice.

Constipation.—The poor colon still has a bad time. But by now the average person should take up a reasonable attitude about constipation. All the talk about constipation poisoning the system is without foundation. Keeping the bowels well opened in acute illness has been an almost holy ritual in the past, but it is now known that a few days constipation in an acutely ill patient seldom causes any discomfort or general symptoms and is a much less evil than exhausting the patient of strength and fluids by vigorous purging. Diarrhoea exhausts a healthy person, and much more so does it distress and disturb the sick.

Many people who regularly take purges are not really constipated. They have been taught by their mothers from childhood days upwards to take opening medicine frequently. In time the bowels become more and more resistant, so that they take larger doses, and this may cause spasm of the muscles with abdominal pain or discomfort. Some seldom pass a normal motion and this diarrhoea may produce general malaise—headache, furred tongue and a poor appetite.

But there are people whose bowels tend naturally to be stubborn, and they can be relieved by simple measures which will be described later.

Constipation may be due to a functional disorder of the colon which may be too lax, with a consequent delay in the passage of the food residue along the large gut. This condition calls for medical attention. Anybody in good health who suddenly develops constipation or alternate diarrhoea and then constipation should certainly have a thorough medical examination.

There may be delay in emptying the rectum. As a result of lazy habits, and the failing to observe the normal call to empty the bowels, the rectum may fill up to a great extent without giving any sense of discomfort. When this is the case, and it is a fairly common cause of constipation, it is obviously illogical to treat by irritating the whole gut with aperients. The best treatment is prevention, and alternatively, the local evacuation of the rectum with an enema or a glycerine suppository.

TREATMENT OF CONSTIPATION

Establish a perfectly regular habit each day at the same time after breakfast. There must be no excuses allowed for not making a real effort to open the bowels. This is most important, and in mild cases may well prove an effective remedy without further treatment.

The next line of attack is by dieting. If the stools are normally formed and passed with little sense of relief take the high residue, high vitamin B1 diet (*see* PART II, CHAPTER II). This gives extra substance to the motions, extra mechanical irritation to the gut, and improves the tone of the muscles. If the motions are small "sheep stools," difficult to pass, and if there is irregular abdominal pain, the colon may be too spastic, and so the low residue diet which will not irritate the gut is required. These two lines of attack are often sufficient without resorting to any medicinal treatment. If you must take medicine, use a lubricant such as liquid paraffin. This is not absorbed at all and lubricates the intestine and helps the passage of fæces. People tend to take too much: one tablespoonful a day is usually enough. For the first type of constipation mentioned above, agar-agar is valuable. This is derived from seaweed and has the property of swelling to many times its normal volume when moistened; it will increase the bulk of the fæces and so stimulate the colon. Emulsions of agar-agar and liquid paraffin can be obtained from chemists and they are a safe and satisfactory aid to treatment.

Even with regular habits, diet, and liquid paraffin, a few people will still have difficulty with their bowels. It is then necessary to give small doses of that group of aperients which act only on the large bowel and exert a tonic effect on its muscle. Phenolphthalein, aloes, cascara or senna are examples; some of these can be bought in combination with liquid paraffin and agar-agar. Purgatives such as castor oil, calomel, jalap, or salts flog the whole gut unmercifully from top to bottom, and completely upset its delicately balanced rhythm. They have no place today in the treatment of constipation.

In a severe case of constipation, it is often necessary to empty the lower bowel mechanically before it is possible to start a regular habit. It is more logical to empty the distended rectum with an enema than to irritate the whole intestine which may be working normally as far as the rectum. There are two ways of encouraging the rectum to empty itself. We may give a glycerine suppository or an enema. The glycerine suppository is simpler but not always successful. It is very easy to insert into the rectum, but remember to dip it first in hot water; this dissolves some of the surface which will act as a lubricant.

To Give an Enema.—The idea is to introduce water into the rectum and so soften the fæces and make them easy to pass. The bulk of the water also stimulates the rectum mechanically, encouraging its evacuation. Sometimes an irritant is added to enhance this effect. Soft soap may be added, or alternatively turpentine may be used.

Give either a plain water enema, using warm water at 100 degrees Fahrenheit, or a soap enema. Special soft green soap is used because ordinary soap is too irritating. A portion about the size of a large walnut is thoroughly dissolved in a pint of warm water; a wooden spoon is the best thing to use to beat up the soap.

The enema is introduced into the rectum through a rubber catheter (No. 12) linked to a glass funnel by a glass connexion and rubber tubing. It may also be given with a Higginson's syringe. This is a simple pump and the fluid is propelled through it by squeezing a rubber ball. At one end is the nozzle which is inserted into the rectum, and at the other the metal sinker which is kept in the enema fluid to be given.

The patient lies on the left side with the knees drawn up, or on the back if he may not be turned. A small mackintosh covered with a small towel is arranged under the buttocks. The bedclothes are turned down leaving the sheet covering the patient. The catheter is lubricated with vaseline and gently passed about three inches into the rectum. Then the fluid is run in through the funnel. Withdraw the catheter and encourage the patient to retain it for at least five minutes. Have a warm bedpan ready. If the Higginson's syringe is used, fill it with the fluid first, and make certain that the metal sinker stays under the surface, for otherwise air may be injected.

Diarrhoea.—Most normal people have the bowels opened once a day, but there are some individuals, otherwise healthy, who have a bowel action after every meal. This is due to accentuation of the normal reflex which makes the small intestine contents pass into the colon. Such people may be ordered by their doctor to take a little dilute hydrochloric acid with meals. Many simple acute infections produce diarrhoea, and nervousness is another important cause. With colitis or inflammation of the colon there is diarrhoea with the passage of blood and slime. See a doctor at once.

Passage of Blood with a normal stool usually means hæmorrhoids (piles). These can be simply treated in most cases by attention to the bowels. If that fails, a doctor will probably treat the patient with a few painless injections into the rectum.

GASTRIC AND DUODENAL ULCERS

Gastric and duodenal ulceration are a common cause of acute dyspepsia. Though usually such cases are admitted to hospital for treatment, in times of national emergency they may have to be treated at home.

If there is definite severe gnawing pain in the upper half of the abdomen soon after, or one to three hours after a meal, there is probably either a very irritable stomach which may develop an ulcer, or else an ulcer actually present. A doctor will diagnose, and he may say an X-ray is necessary for an exact diagnosis. This will be done at hospital. If X-ray shows that an ulcer is actually present the quickest way to get it healed is to rest in bed and take the strict routine ulcer diet described in Part II, Chapter II. Apart from getting up for toilet, the patient should stay in bed for a period of from two to six weeks as the doctor advises.

Smoking is harmful for people with gastric and duodenal ulcers, but one cigarette after meals for the inveterate smoker may be allowed. The patient must not worry. Unfortunately ulcer subjects are often of the worrying type. An unhappy patient heals his ulcer much more slowly than the patient who has resigned himself to his treatment. People who have had gastric or duodenal ulcer are always prone to develop further ulcers if they neglect their diet, oversmoke, have too little sleep, or irregular meals or new anxieties. When faced with a difficult time they should return to the light convalescent diet, take extra milk between meals and alkaline powder. Too many rely on their powder alone, but extra milk and a sleeping medicine may be more valuable at the onset of a relapse.

Gastric and duodenal ulcers have two unpleasant complications. They may rupture into the peritoneal cavity, and this causes sudden onset of agonizing pain. It is essential to operate as quickly as possible. Every hour delayed makes the chances of recovery appreciably worse.

Hæmorrhage from the ulcer is the other complication and this is the less serious of the two. Blood may be vomited, and because of the acid in the stomach it looks exactly like coffee grounds; or it may be passed from the bowel as a black, tarry stool. When there is hæmorrhage the patient must stay at complete rest in bed, on his back, and at first without a pillow. He should be seen as soon as possible by a doctor. It will help the doctor if a half-hourly record of the pulse is kept.

An injection of morphia is usually given and this will allay the anxiety of the patient. Until a few years ago, fluids were withheld by mouth, but it is now known that it is better to feed the patient from the beginning. On the first day give two-hourly feeds of 5 oz. of milk and at the odd hours between give 5 oz. of glucose orangeade, in which a third of a teaspoonful of salt has been added to each pint. On the next day give the routine diet for ulcer (*see* page 256). Sometimes a blood transfusion is necessary. The patient must be washed and fed and not allowed to do anything for himself. Keep the stools for the doctor to see. The bowels are often confined for several days after a hæmorrhage and it is best to wait five days before giving an enema. In the meantime liquid paraffin may be given. Although hæmorrhage is such an alarming complication, with modern treatment only about one patient in fifty dies from the bleeding.

CHAPTER X

NURSING OF URINARY DISEASES

(See also Part I, Chapter II.—The Urinary System)

If we cast our mind back to the description of the way in which the kidney functions, we remember that the kidney filters off water from the circulation through the filter buds, and reabsorbs much of the fluid in the tubules of the kidney, leaving substances in solution concentrated. This fluid with its concentrated substances in solution passes on down the urinary tract and is excreted as the urine.

Nephritis (Bright's Disease).—Nephritis is a condition of inflammation of the kidney itself. Such an inflammation attacks principally the filter buds and tubules of the kidney. In acute nephritis the onset is sudden and is often secondary to some infection elsewhere in the body. It is common for the patient to have an acute infection, such as an acute sore throat or scarlet fever, signs of nephritis appearing two or three weeks after such an infection. In the case of scarlet fever the first signs of nephritis commonly appear when the patient is getting better, and the rash is almost gone, or is fading. Any other acute infection may be followed by nephritis; and an acute inflammation of the ears is quite often followed by the appearance of nephritis.

Factors which seem to precipitate the onset of nephritis are exposure to cold or damp, or sitting in a draught. People run down and debilitated from other diseases are all the more likely, if they develop an acute sore throat, to develop kidney trouble; yet out of hundreds of cases of sore throat, nephritis is a rare complication. Over-indulgence in alcohol is another precipitating factor.

Acute Nephritis. — This condition may start in three ways:

1. The patient—often a child, for the condition is more common in children, adolescents and young adults—develops a pallor or puffiness of the face. The condition usually follows an acute sore throat or tonsillitis. This swelling (œdema) appears chiefly in the sites where the skin is loosely attached to the underlying structures; that is, round the eyes, in the ankles, round the buttocks and the lower part of the back. The œdema may be so marked that the child appears puffy almost all over, but it is usually confined to the eyes and ankles.

2. The urine becomes scanty and is passed very frequently, only a few tablespoonfuls being passed at a time. What there is of it is a smoky dark red colour, due to blood being passed in large amounts from the inflamed congested kidneys.

3. The patient has sore throat, backache, headache and pains in the limbs. In addition it is not uncommon for there to be a feeling of sickness, and actual vomiting and diarrhoea may be present. In severe cases there are bad shivering attacks and even convulsions.

These are the three main groups of

symptoms, but it is usual to see a combination of all three in one patient, one symptom or symptoms standing out more strongly than the rest.

At the commencement there is fever lasting for some five to twelve days with a rapid pulse. Albumen is found in the urine. The blood pressure is raised in the first ten to fourteen days. The disease may clear up completely within a few weeks, or it may subside for a time to flare up again later. Occasionally it runs on to a chronic stage without the urine ever clearing. Acute nephritis should therefore be nursed very carefully until all signs of blood and albumen have disappeared from the urine, for once it runs on to the subacute or chronic stage it is a much more serious matter.

In a few cases there is marked temporary improvement and then a relapse in a week or two. In such cases it is more than likely that the patient has been exposed to chill, or has contracted a fresh infection. Complications otherwise are not very common. Hospital treatment for acute nephritis is best, and skilled nursing is needed to prevent complications and effect a more rapid cure. Under supervision and with good home nursing, however, excellent results can be obtained at home.

TREATMENT OF ACUTE NEPHRITIS

The patient is put to bed between blankets, in flannel pyjamas, and if he sweats excessively he should be dried with a towel, for if allowed to sit in wet pyjamas a chill is liable to be contracted. He must be totally confined to bed, except that he may use a chamber or commode *in the room*. He must not walk about. The bowels should be opened, if necessary with salts, and if there is much aching over the kidney regions hot fomentations may be placed over them. If any convulsions or twitchings occur the patient should be transferred to hospital if the doctor in attendance passes him fit for the journey. It is important in all cases to have the doctor in regular attendance.

The diet is important and the following is a useful guide.

First to third day. Not more than one pint of total fluid within the twenty-four hours, made up of sweetened orangeade, weak lemonade well sweetened, or barley water. A little toffee, barley sugar or raw apple may be taken, but milk is best avoided.

DIET IN NEPHRITIS

About the fourth day the output of urine will probably increase and become less bloodstained. When this occurs, increase total fluid to two pints, allow half a pint of milk (diluted half and half with soda water or water), bread and butter (a few thin slices), a cup of milk food or weak sweetened tea. In a further three to four days, if improvement continues, increase total fluid further and raise the milk to two pints a day. Also start with bread and milk, toast, honey, potatoes and greens, gradually adding milk puddings, fruits (bananas), suet pudding, fish, chicken, porridge and boiled mutton. Eggs are best left until last and then only given very occasionally. Salt should not be allowed while any œdema is present, either in the cooking or added afterwards. All meat and any vegetable extracts are best avoided, also coffee, alcohol, bacon, red meats, ham, pickles, sauces, cheese and other spicy or highly flavoured substances. (*See also* CHAPTER XI, FEEDING THE INVALID.)

It should be noted that the patient is more or less starved for the first few days. Convalescence is important, for the patient must be kept in bed until the urine is normal, the temperature and blood pressure normal and all swelling is absent. As such patients are often anæmic, iron medicines are useful. The patient should always have a period of a month's convalescence at least before returning to work or school. The acute condition in itself is not usually serious, except in its tendency to run on to the much more serious chronic form. Full and prolonged treatment must therefore be given to the condition while it is in its acute phase.

Sub-acute Nephritis. — A patient with acute nephritis may recover completely and never have any further kidney trouble, but he may be only partially cured and pass on to the sub-acute stage. A person, therefore, who has had acute nephritis should be under supervision for years afterwards and should have his urine tested every two or three months for any signs of relapse, and he should take great care to avoid exposure, chills, colds, sore throats and over-consumption of alcohol. If the tonsils have been a likely cause of the trouble they should be removed, but only when the general condition is good, and the acute infection has completely subsided.

In sub-acute nephritis the swelling, which was seen in the acute stage, gradually returns, or if it never completely disappeared becomes more marked. It is seen round the eyes, in the ankles and often more diffusely (generalized œdema). The blood pressure which subsided to normal in the acute stage becomes raised again and the heart gradually becomes enlarged. Albumen is present in the urine. It must be noted that in many cases the acute nephritis may have been so very slight as to have been overlooked completely and these signs of sub-acute nephritis are the first to be seen. A stage further is chronic nephritis.

Chronic Nephritis.—There are two varieties of chronic nephritis, the dry and the wet. In the wet variety, œdema is the predominant sign as it was in the sub-acute stage. The tissues of the body may be sodden with fluid, which the kidneys cannot excrete, and in addition fluid may collect in the abdomen, swelling out the abdominal wall in the chest causing some breathlessness and even in the pericardium which surrounds the heart. The blood pressure is always raised and albumen is present in the urine in very variable amounts. This stage of chronic nephritis is an advanced stage of kidney damage, and is in the end fatal.

Symptoms of uræmia occur in the final stages (*see* URAEMIA).

Treatment of sub-acute nephritis and chronic wet nephritis is the same. So long as œdema is present the patient is kept warm in bed and great care is taken lest bed-sores develop, for the water sodden tissues are more likely to break down over the pressure points than are normal tissues. An air cushion is used and the patient's position changed every hour or two (*see* TREATMENT OF BED-SORES, page 42). The bowels should be kept open with a suitable mixture prescribed by the doctor, for certain opening medicines are harmful to the kidneys. Senna, aloes, liquid paraffin and cascara are allowed.

As regards diet, salt should not be allowed except for a little in the cooking. Meats should only be given in very small amounts (*see* CHAPTER XI—FEEDING THE INVALID).

Dry Variety.—In the dry variety of chronic nephritis there is no œdema, but the patient may complain of loss of appetite, indigestion, headache, shortness of breath, weakness and some frequency in passing water, particularly at night. Symptoms of uræmia may appear, a bad sign as the last phase is now beginning. Such symptoms are nausea, vomiting, diarrhoea and loss of weight. On examination of the patient the blood pressure is found to be raised and the heart enlarged. The patient's sight is often deficient. The urine contains some albumen.

The patient need not be bedridden as the symptoms may not be very troublesome, but as he goes about his daily duties he must practise moderation in all things, and should, if possible, abstain from tobacco and alcohol, the latter particularly. He needs much more rest than the ordinary man, and should not work or do anything except in moderation. He must avoid chills and exposure. His diet should be light and nourishing, and much on the lines of those described for wet nephritis. Certain drugs are helpful to ease different symptoms. If headaches are troublesome aspirin may help. Sedatives for sleeping (e.g., bromide and chloral hydrate) are helpful. The bowels should be kept regular.

URÆMIA

When the kidney begins to fail to function satisfactorily, substances collect in the blood stream which would normally be excreted in the urine. These substances poison the system. There are a vast variety of them, and urea is only one. Uræmia, therefore, is a series of symptoms due to retention of urea and other substances in the blood stream because of the failure of the kidney to excrete them. There are two varieties, acute and chronic.

Acute Uræmia.—This occurs quite suddenly during acute or chronic nephritis, usually the former. The patient who has up to this time been fairly well suddenly becomes seized with convulsions or becomes comatose. Frequently the convulsions occur first and may be confined to certain muscles or be generalized, being rapidly followed by unconsciousness. Blindness in one or both eyes may occur. The blood pressure rises higher than it has been previously. Warning signs of acute uræmia are loss of appetite and headache and general deterioration in the patient's condition. Acute uræmia is very serious and it is essential that the doctor should be called in immediately the first signs appear.

Chronic Uræmia occurs more gradually. The patient has chronic nephritis, and the onset of uræmia means that the final stage of kidney failure has been reached. The patient may be now a little better, now worse, and then better again, and so on for many months. The symptoms fall naturally into three groups due to upset of three of the main systems of the body, the alimentary or digestive tract, the nervous system and the respiratory system.

1. *Alimentary symptoms.* These are loss of appetite, and an unpleasant taste in the mouth, often bitter or like ammonia. A feeling of weakness, vomiting and diarrhoea or constipation may occur. Of these, vomiting may be the most annoying and troublesome symptom. A stomach washout sometimes is helpful or a little sodium bicarbonate, but very frequently the symptom is difficult to control.

2. *Nervous symptoms.* These are weakness and sleepiness. The patient finds it difficult to concentrate and the mind becomes cloudy and dull. A normally intelligent and quick-witted woman finds it difficult to recall when her birthday is, or even the names of those about her, and remains all the time in a sort of mental haze. A dull, persistent headache is not uncommon, and muscle twitchings occur in some cases. In the latter stages there is often a persistent hiccough, particularly

difficult to control. Fading of the sight occurs and, in the final stages, convulsions and coma.

3. *Respiratory symptoms.* Attacks very like asthmatic attacks occur in this condition. The patient becomes very tight in the chest and wheezy. Another abnormality noted is deep sighing, and alternating deep and shallow breathing. Other symptoms which may be noted are a dull muddy yellow skin with much irritation, and sometimes a red rash, aggravated by the patient's scratching. Little granules like salt appear on the skin (urea frost). These granules are actually the urea crystallizing out in the skin. The temperature is usually sub-normal, and there is wasting and loss of weight.

Strictly speaking the patient with uræmia should have hospital treatment; if not, the doctor should be in attendance. If this is impossible the treatment should be as for chronic nephritis. The drugs that are used are chiefly to ease discomfort. The mouth should be kept as clean as possible, as it tends to become dry. The diarrhoea should be treated by bismuth and constipation by a senna aperient or an enema. The sleeplessness noted in some cases can be treated by bromides. Some patients should not take bromides, and in such cases it is best to give another drug such as phenobarbitone.

For the dull persistent headache, aspirin may be given, but phenobarbitone is often better. Calcium tablets help to stop the muscles twitching. There is nothing which will help the eyesight, and the hiccough, too, often will not yield to treatment. A simple trick that sometimes works is to hold a paper bag over the patient's nose so that he breathes the same air in and out for four or five minutes. The carbon dioxide in the expired air in some cases when rebreathed, stops the hiccough. Calamine lotion eases the irritation of the skin and the patient should be told not to scratch himself, but to dab on the calamine lotion instead.

Chronic Nephrosis.—This is a condition which is not very commonly seen, but when it is, it is quite striking and calls for special lines of treatment. There seems to be some doubt whether it is a true disease, or is just an unusual type of sub-acute nephritis. Be that as it may, as the treatment is somewhat different we will describe it as a separate entity. The outstanding thing about the patient is the gross puffiness and œdema. The legs, thighs and abdomen, face, arms and chest are puffy and swollen. Fluid is present inside the abdominal cavity (ascites) giving it a swollen appearance. The skin is stretched tight and so distended is the abdomen that the navel may be turned inside out. Fluid may also be present in the chest on one or other side rendering the patient short of breath. Another striking finding is the amount of albumen in the urine. The urine may turn almost solid on heating. The condition differs from sub-acute nephritis in that the heart is not enlarged and the blood pressure is not raised.

Treatment should only be instituted according to the doctor's strict instructions, as other conditions may be easily mistaken for it in the early stages. Bed, rest, warmth, avoidance of bedsores and exposure are as important as they are in the other conditions; expert nursing is therefore all important.

Small doses of thyroid extract are given, such as half a grain thrice daily, the amount being increased at the doctor's discretion. Diuretics (*see* page 133) are very helpful to effect increased excretion of fluids via the kidneys and, therefore, a reduction in the amount of œdema. Urea, in doses of fifteen grammes thrice daily, may prove very helpful, or salyrgan (mersalyl or neptal), a mercurial drug which is only given by injection by the doctor.

Much protein is needed, and the high protein diet which will be found on page 252, should be followed.

BACILLUS COLI INFECTIONS

Any part of the body may be attacked by bacteria. The urinary tract is no exception. Organisms may infect some part of it by spreading from the intestine or via the blood stream from some other septic focus. Depending on the part chiefly involved these infections are called pyelitis (inflammation of the kidney pelvis), pyelonephritis (kidney pelvis and kidney itself), cystitis (bladder) and urethritis (urethral inflammation). A large number of organisms are capable of causing infection, but by far the commonest is the bacillus coli, an organism normally living harmlessly in large numbers in the intestine.

It seems that under certain conditions the organism escapes from an environment where it is harmless to infect the tissues and cause damage. If the organism makes its way to the kidneys it sets up acute pyelitis or pyelo-nephritis. It may spread to the kidney and kidney pelvis.

PYELITIS AND PYELO-NEPHRITIS

At the onset the disease is acute and the symptoms are well marked. The patient is taken suddenly ill. His temperature rises much above 100 degrees Fahrenheit, and often as high as 105 degrees Fahrenheit. He feels and looks toxic and ill. It is more common in the female sex, and female children suffer much more frequently than boys. There is often aching and tenderness in the loins and frequency of passing water. Bad shivering attacks (rigors) are not uncommon, particularly early in the disease, but they are not specific for this disease as they occur in any high fever of rapid onset.

On examination the tongue is seen to be dry and furred. The skin is hot and dry, later becoming hot and moist, and there is often some tenderness over one kidney, sometimes both. On examining the urine it is found to be acid and to contain a little albumen. When it is examined at the laboratory it is found to contain pus and the infecting organism. At the onset of the disease blood may be present in the urine, but it is rarely in large enough amounts to show as a smoky, brick red urine such as we find in acute nephritis. One thing often noted is that the urine has a peculiar fishy odour. In children the disease is fairly common. Always suspect infection of the kidney pelvis if a female child has a sudden high fever for no apparent reason, and have the urine properly examined.

The patient is nursed in bed, the bowels being kept open by salts, cascara or enemas. Much fluid is given; if possible the patient should drink eight pints or more every day of barley water, plain water, weak orangeade or lemonade suitably sweetened. Milk should not be given in large amounts, and is best given diluted with ordinary water, not more than one pint of milk being taken in the course of the whole day.

As the bacillus coli thrives in an acid urine it helps the patient to alter the reaction, and alkaline mixtures are very helpful. To test the reaction of the urine litmus paper is used. This paper can be bought at any large chemist, and you should buy two packets, one red and one blue. Tear off a small piece of each and drop it in the urine. If it is acid, the red litmus paper remains red and the blue changes to red. If alkaline, the blue remains blue and the red changes to blue. If it is neutral in reaction, there is no change either way, the colours remaining unaltered. In pyelitis and pyelo-nephritis caused by bacillus coli the reaction is a red or acid one, and it is useful to give alkalies in sufficiently large amounts to change the reaction to blue. A suitable mixture is one containing potassium citrate (about thirty grains for an adult every four hours) or a mixture of different alkalies: sodium bicarbonate thirty grains, sodium citrate thirty grains and potassium acetate thirty grains. When the reaction becomes alkaline the temperature will usually fall, and the dosage may be reduced to four times a day and finally to three times a day. If the reaction does not change the alkaline dosage may have to be increased until it does.

Another useful drug is hexamine (urotropine). With this drug it is necessary for the urine to be acid (litmus red) for the drug only acts satisfactorily in an acid medium. To render the urine acid a mixture containing sodium phosphate may be given. An ordinary dose of hexamine is twenty to thirty grains four times a day, and of acid sodium phosphate thirty to sixty grains three or four times a day. In some cases it is a useful plan to ring changes in the treatment—changing the reaction from alkaline to acid and back again. Frequent changing of urine in this way is often found to be very effective.

Another very useful drug is mandelic acid or one of its salts e.g. calcium or ammonium mandelate. This is often successful where other drugs fail. This drug should not be given when the temperature is very high in the acute stage of the infection, and it should only be given when under the definite advice and supervision of the doctor.

In conclusion, one of the new drugs on the market such as sulphanilamide or sulphapyridine (M. & B. 693) may be given. These are in tablet form and may be given in the acute stage of the infection. They should not be given except under the doctor's supervision.

DIET IN PYELITIS OR PYELO-NEPHRITIS

When the temperature drops the diet can be gradually built up, leaving fats and meats to the very last. The first additions to the diet should therefore be bread, toast, potato, etc. The patient is not allowed to get up until the temperature has been constant for several days and all symptoms have disappeared. Too early cessation of treatment leads to persistence of the infection, which becomes chronic. Once a disease has become chronic it is much more difficult to treat. It is of great importance, therefore, to have the urine properly examined after all treatment has been stopped to make certain all infection has disappeared completely. Further examinations of the urine should be made periodically for the next two or three months.

Chronic Pyelitis and Pyelo-nephritis are not discussed here as proper treatment in hospital or under constant medical supervision is essential.

Cystitis (inflammation of the bladder).—Cystitis may be due to the same organisms as cause pyelitis and it may co-exist when the urinary tract from kidney to bladder has been infected. When acute the patient is taken suddenly ill with severe pain in the lower part of the abdomen over the bladder, or lower down just in front of the anus. The patient has to pass water every five minutes or so, only passing about a teaspoonful at a time. Usually there is no fever and little or no general upset. If bacillus coli is the causative organism the urine is acid, but with mixed types of organisms (as sometimes occurs) the urine is alkaline. The urine is cloudy and contains a trace of albumen and blood in some cases.

The patient is kept in bed so long as the acute symptoms are present, and is only allowed to get up and about when he has no symptoms at all and the urine is completely normal, or almost so. Copious fluids are given. Hot applications such as hot fomentations or a hot-water bottle wrapped in flannel are placed over the bladder to ease the discomfort. Diet and care of the bowels are as described under pyelitis, and the methods of changing the reactions of the urine from acid to alkaline and vice versa are the same. Hexamine and mandelic acid may also be employed. As there is often an element of painful spasm the addition of tincture of hyoscyamus, thirty minims, four times a day to the alkaline mixture is helpful. This is an anti-spasmodic. A muscle spasm in the urinary tract causes pain, and an anti-spasmodic may give more relief than anything else.

Urethritis. — Inflammation of the urethra is not an uncommon condition; it commonly occurs in young males, and is due to gonorrhœa. There are other causes, but this is so frequent as compared with the others that it will be the only cause of urethritis which will be discussed here.

Within six days of direct exposure to infection there is tingling and irritation in the penis, and pain in passing water. The urine is turbid with pus and a little blood may in some cases be present. A greenish purulent discharge appears at the urethral orifice.

Treatment is on no account to be undertaken by the patient himself, and he must report to his doctor or to the nearest clinic, where he will receive expert treatment entirely free, under conditions of the strictest secrecy. The discharge contains the actual bacteria, and is therefore highly contagious, particularly to the eyes. It is essential to destroy all contaminated cotton wool or gauze used to protect the parts. It should be emphasized that every day's delay in attending the treatment centre after the appearance of the discharge means several extra days of treatment and greatly increased risk of serious complications.

In the female the condition is essentially an inflammation of the neck of the womb (cervicitis) causing a purulent discharge and inflammation of the genitalia with redness, swelling, itching and irritation. It may be overlooked if slight, or attributed to other causes. If there be any doubt as to the existence of this condition, bacteriological tests should be made by the doctor.

Tuberculosis of the Genito-urinary Tract.—The tubercle bacillus may infect almost any part of the body. The commonest part affected in this country is the lung, but happily when the lung is affected, the kidney rarely is, and vice versa. The infection seems usually to be a blood-borne one from some focus elsewhere, e.g., lymph glands, and little areas of infection appear in the kidney. From this, infection spreads down to involve the pelvis of the kidney, then the ureter and finally the bladder. When the kidney alone is involved there may be aching in the loin, but the symptoms may not be very marked. Discovery of blood and pus in the urine should make one suspect tuberculosis if no organism can be found, for the tubercle bacillus is not at all easy to find in the ordinary case. When the infection has reached as far as the bladder the symptoms of cystitis are caused.

If tuberculosis is diagnosed, treatment cannot be carried out at home. Hospital or sanatorium treatment is necessary. As in all tuberculosis conditions prolonged rest is essential with good food and expert attention.

Stones may occur anywhere in the urinary tract. Commonly they form in the kidney near to the pelvis and pass downwards. If they are small they are passed in the urine with a certain amount of pain and a little blood in the urine. The outstanding symptom is renal colic (*see* page 138). Acute infections, such as we have discussed, may be accompanied later by stone and it is not unusual to see stones in the X-rays of people who have had chronic pyelitis or tuberculous disease of the kidneys for a long time.

Another contributing factor is partial obstruction to excretion. Anything which interferes with the excretion of urine tends to produce not only infection, but stone formation. Another factor is excessive fluid loss by other channels, such as sweating and vomiting, causing over-concentration of urine.

SYMPTOMS OF STONES

If the stone remains in the kidney there will either be no symptoms, or the patient may complain of aching in the loin. Albumen or blood may be found in the urine in small amounts. If the patient is shaken up, say by jolting in a bus over bad roads, more severe symptoms may be produced. The same effect is obtained by thumping the patient over the kidney angle in the back. If this causes acute pain such as he has complained of before, it suggests a diagnosis of stone.

The stone may pass into the pelvis of the kidney and lodge in the lower part of the pelvis leading into the ureter, there causing obstruction to the outflow of the urine and stretching of the tissues. This causes quite severe pain, or typical renal colic as previously described. There is at the same time frequency, though little water is passed at a time, and that is often blood-stained. The attack lasts anything from two minutes to two hours, or even longer, leaving the patient exhausted with aching or tenderness in the loin.

PAIN IN STONE

If the stone is situated in the kidney, pelvis or ureter the pain tends to radiate from the kidney angle in the back below the last rib over the affected kidney round to the front, and down to the genital organs on the same side, or farther down into the thigh or groin. The testicle on the affected side is often drawn up. If the stone has passed into the bladder and stuck at the entrance to the urethra, the symptoms may be those of cystitis, but the colic pain tends to come at the end of passing water and is referred to the point of the penis, radiating to the inner side of the thigh or to a point just in front of the anus.

X-rays usually, but not always, show where the stone lies. Apart from the pain it causes, stone in the urinary tract has always to be regarded as a serious condition as it causes infection, prevents the proper excretion of urine and damages the structures it lies in, and also interferes with (or even stops) the functioning of the kidneys.

Plentiful fluids are given as described in the treatment for pyelitis, particularly if the weather is hot.

During an attack of pain heat is applied to the loin in the form of a hot-water bottle covered with a flannel jacket or a warm pack. A hot bath will relieve a mild attack. For a severe attack the doctor gives an injection; if this does not ease a very severe pain an anæsthetic may be necessary.

After the attack, an anti-spasmodic alkaline mixture is given to help the patient pass the stone. Such a mixture may contain tincture of belladonna, fifteen minims, and thirty grains potassium citrate given every six hours until the pupils dilate. At this point the dosage must be reduced. If this does not act satisfactorily an operation may be necessary, the stone being removed surgically. These drugs can only be given under doctor's supervision.

"Floating" (Mobile) Kidney (Nephroptosis).—By this picturesque title is meant a kidney which is held rather more loosely than normally, and is therefore more mobile on respiration. In the normal person the kidney descends on inspiration, being pushed down by the descent of the diaphragm, returning to its former site on expiration. The kidneys are normally not to be felt in the abdomen, even on full inspiration, but if nephroptosis is present the kidney can be felt in the abdomen to descend on the affected side with inspiration, and if the condition is marked it may even be grasped by the hand through the abdominal wall.

The causes of undue kidney mobility are numerous. Generally speaking it is as much a part of the bodily build as a long nose, causing no symptoms in most cases. Once a patient is aware that the kidney is floating he is apt to consider this the cause of any abdominal pain he has. He may become anxious and feel that he has some dangerous disease. The term floating kidney is therefore a bad one, as the imaginative patient pictures all kinds of awful complications. Let the doctor reassure the patient, and then try to keep him from worrying about it at all.

HIGH PROTEIN DIET FOR NEPHROSIS

Much protein is needed to make up the deficient plasma proteins. Such a diet (for example, that of Epstein) is the following; high in protein, low in fats.

Breakfast.—6 oz. cooked white fish, 2 oz. lean ham, 1 oz. uncooked oatmeal, 8 oz. skimmed milk, 2 oz. bread, ½ oz. marmalade or honey, 5 oz. tea.

Lunch.—3 oz. lean cooked meat, 1 oz. uncooked rice, 2 oz. peas or lentils, 8 oz. skimmed milk, 2 oz. potatoes.

Tea.—2 oz. bread, 4 oz. apple or pear, 5 oz. tea, 1 oz. skimmed milk.

Dinner.—4 oz. cooked white fish, 3 oz. lean cooked meat, 2 oz. peas or beans, 2 oz. toast, 1 oz. uncooked rice, 8 oz. skimmed milk, 4 oz. coffee.

Sugar for sweetening for the whole day, 2 oz. No, or very little, salt should be used for cooking, none should be added to the meal.

CHAPTER XI

FEEDING THE INVALID

by F. AVERY JONES, M.D., M.R.C.P.

(*See also Part I, Chapter X—Food and Its Values*)

MANY illnesses need diets which will make allowances for the damaged parts of the body. Some people are rather frightened by special diets because they are afraid they may not quite follow the directions, and harm the patient. The ideas behind the diets are usually very simple and if understood it is difficult to go far wrong. One of the ways in which the housewife can help the patient and the doctor is by providing the correct diet.

MAKING FOOD ATTRACTIVE

There are several golden rules. Always make the food as attractive as possible. An ill patient has a poor appetite and a neat, dainty tray may make just the difference. Be very careful to avoid monotony, for there is nothing worse for the appetite than the same food served every day. Add colour to the dish. By varying the colour with the different coloured vegetables, jellies and sauces, dull dishes can be enlivened and enjoyed. Never let the invalid feel his diet is a nuisance. Your extra effort is shortening the illness.

An ill, feverish patient usually fancies only liquid foods and for a short illness lasting one to four days it is sufficient if he has plenty of water, glucose and fruit juices. Any feverish person should have at least five pints in the twenty-four hours. Give more if they wish and never let them be thirsty. Glucose (from the chemist) is obtainable and is such a very easily digested source of energy in illness.

Give plenty of fruit juices, especially orange juice or lemonade. They are refreshing and supply the valuable vitamin C, for the needs of the tissues are much increased by fever. More than one pint of milk a day is best avoided when the temperature is high, because it may cause distension of the bowel and make the patient very uncomfortable. When given, dilute with water or soda water. Ginger ale, or a proprietary product rich in vitamin B in water are drinks that may be enjoyed.

For a short illness like influenza or pneumonia, or measles, it does not matter very much if the full amounts of protein and fat are missing. An acutely ill patient will not tolerate a full diet, and experience has shown that plenty of fluids and glucose is sufficient. It is a different story for the long, feverish illness. For the septic patient with an abscess when fever may be present for several weeks, the diet must supply all the energy and protein necessary to prevent the patient losing weight and so lessening his resistance to the infection.

DIET IN ACUTE STAGE

Give two-hourly feeds of large cupful or a glass of glucose orangeade alternately with one of the following: milk and soda water, lemonade, ginger ale; water between feeds as desired; ice cream may be enjoyed, and is nutritous and easily digested.

As the temperature falls and the patient feels better, add at ordinary meal times: thin bread and butter or toast; egg in milk or jelly, or blancmange, fruit purée, custard or junket. Add next day: mashed potato; steamed fish or minced chicken; lightly boiled egg.

If there is soreness of the throat the doctor may order a semi-solid diet.

Breakfast.—Porridge, groats or patent barley; tea or coffee with milk and sugar to taste.

Mid-morning.—Mashed banana with milk or cream and sugar.

Dinner.—Minced fish, chicken or rabbit with white sauce; mashed potatoes; milk pudding, custard, jelly, junket; stewed or baked apple or other soft fruit.

Tea.—Bread and milk; tea.

Supper.—Scrambled eggs; pudding as at dinner.

Bedtime.—Warm milk.

Tomato or orange juice daily.

DIET IN CHRONIC ILLNESS OR CONVALESCENCE

We want to give a rich, body-building diet, so we increase chiefly the protein and vitamins. Persistent fever means that the body is burning up more energy than usual so we also need extra sugar and fat.

Breakfast.—Orange juice or grapefruit (or with dinner); porridge or breakfast cereal with milk and sugar; add 1 tablespoonful of a vitaminized cereal; bloater or kipper, or scrambled eggs, or fried bacon and egg with fried tomato or fried potato; bread or toast with butter or margarine and marmalade or syrup; tea or coffee.

Mid-morning.—Cocoa made with milk, or a vitamin B product, ½ teaspoonful in glass of milk.

Dinner.—Grapefruit or orange juice (or with breakfast); thick soup with grated cheese; meat or fish; liver once a week; potatoes; green vegetables with margarine or salad and mayonnaise; stewed or fresh fruit, custard.

Tea.—Brown bread and butter (or dripping); honey or jam or syrup or fish paste; cake or shortbread; tea.

Supper. — Milk, vegetable soup; scrambled egg on toast, or roes on toast, or Welsh rarebit.

Bedtime.—Warm milk, or any proprietary preparation that is liked, prepared with milk.

DIET IN ACUTE GASTRO-ENTERITIS

A doctor should see every case of acute vomiting and diarrhoea in the family. The episode is usually due to contaminated food. With modern canning methods it is rare for canned food to be the cause. In summer time it follows the contamination of food by flies carrying germs. This can and must be prevented, especially when there are infants in the house, for they are particularly liable to serious summer diarrhoea. Sometimes the diarrhoea and vomiting is due to other causes which the doctor must exclude. The housewife must remember to save the vomit and a stool for the doctor to inspect, for this will be of help to him in the diagnosis.

While the acute symptoms persist, do not give any solid foods. Give frequent small feeds of dilute glucose saline. To a pint of water add 4 teaspoonfuls of glucose and one-third of a teaspoonful of salt. The salt will barely taste and is much needed to replace the loss from vomiting. Give about half a small cupful every half-hour. As the symptoms subside add diluted milk (milk and water or soda water in equal parts), jelly, rusks, toast or thin bread and butter, arrowroot, cornflour or custard, eggs and fish.

After an attack of diarrhoea and vomiting the bowels may be irritable and it may be wise to take a bland, low residue diet, that is, one which omits the common indigestible foods and those with roughage, that is, indigestible residue. Fruit, vegetables (except those stated), salad, brown bread, porridge and wholemeal cereals, digestive biscuits, coarse meats, or fish with small bones are therefore eliminated, as are such indigestible articles as highly seasoned foods, fried foods, twice cooked meat, nuts and fruits with pips and seeds.

LOW RESIDUE DIET

Breakfast.—Strained orange or tomato juice; tea or coffee with milk and sugar; puffed rice, cornflakes or patent barley with milk and sugar; boiled, poached or scrambled eggs (not fried), or smoked haddock; white bread or toast and butter; honey, syrup or strained jelly marmalade.

Mid-morning.—Milk flavoured with any proprietary preparation that is liked; plain biscuit or plain cake.

Dinner. — Chicken, rabbit, white fish, sweetbreads, brains, tripe (not onion), or minced tender lamb; mashed old potatoes (no other vegetables); milk pudding, custard, blancmange, junket, milk jellies, sponge puddings.

Tea.—Tea with milk and sugar to taste; white bread and butter; honey, syrup, jelly, cream cheese; sponge or plain Madeira cake (no fruit, peel, seeds or nuts), or plain biscuits (but not wholemeal, oatmeal or coconut biscuits).

Supper.—Soup made from a proprietary product rich in vitamin B; white fish, cream cheese, macaroni and cheese; eggs (boiled, poached or scrambled) or fish roes; white bread and butter; pudding as at dinner.

Bedtime.—Milk or flavoured milk as at mid-morning; plain biscuits.

Leaving out those foods with roughage must mean reducing the vitamin B so that is why it is necessary to take the well-known proprietary product rich in vitamin B at some time of the day, either as soup or in milk or on bread and butter.

DIET IN ACUTE DYSPEPSIA

When there is pain after meals either soon afterwards or one to three hours later, it is wise to see a doctor and often an X-ray examination of the stomach is necessary.

A common cause of pain is gastric or duodenal ulcer, but it may be due to gastritis or to a disorder of function from worry and anxiety, or faulty food habits. There are other occasional causes too, which the doctor must eliminate when he examines the case.

For acute dyspepsia, we need a bland, non-irritating diet which will not stimulate gastric secretion too much and which will neutralize much of the acid in the stomach. Milk is the very best basis for the diet as it is easily digested. It neutralizes its own volume of the acid in the stomach and so commonly relieves pain. We give frequent small feeds to avoid distending the stomach and to keep the acid neutralized as long as possible. We give extra fat which again depresses acid secretion, or the doctor usually prescribes anti-acid powders. As the patient with a gastric ulcer may need the diet for some months it must contain all the usual essentials.

DIET FOR PEPTIC ULCER

If the pain is severe, the patient is best given only milk, or milk flavoured with any proprietary product that is liked, every hour. Give about 5 oz., that is, a teacupful. Buttered cream crackers, and sieved apples and milk jelly or blancmange may be added as soon as the pain subsides. Then the patient should pass on to a routine ulcer diet for the three to six weeks it may be necessary for him to stay at rest in bed.

ROUTINE ULCER DIET

On waking, Milk, 5 oz.

8 *a.m.* Vitaminized cereal (proprietary), 1 oz., milk, 5 oz. (1 teacup); 2 thin slices of buttered crisp, dry toast or rusks or cream crackers; lightly boiled egg.

10 *a.m.* Milk, 5 oz.

12 *Noon.* Steamed fish, or minced chicken, or tripe (no onion), white sauce; 1 potato well cooked and rubbed through a sieve; carrot or tomatoes rubbed through a sieve, or heart of cauliflower; juice of 2 oranges.

2 *p.m.* Cereal pudding or junket; apple purée.

4 *p.m.* Weak milk tea; 2 slices of buttered, crisp, dry toast, or cream crackers, or rusks; bramble jelly; sponge cake.

6 *p.m.* 1 lightly boiled egg or lactic acid cheese or cream of vegetable soup; 2 slices of buttered, crisp, dry toast or cream crackers or rusks.

8 *p.m.* Junket or milk jelly or blancmange.

10 *p.m.* Warm milk, 5 oz., or milk flavoured with any proprietary preparation that is liked.

During night, if awake. Warm milk, 5 oz.

Cod liver oil, dessertspoonful before noon, 6 p.m. and 10 p.m. feeds.

Alkaline powder as ordered.

CONVALESCENT PEPTIC ULCER DIET

We can now dispense with the two-hourly feeds and return to ordinary meal times. We still allow plenty of milk and avoid all the common indigestible foods which are forbidden.

Breakfast.—Freshly made weak tea; milk, ½ pint; 1 egg lightly cooked; 2 slices of thin, dry toast, jelly marmalade; porridge or cereal with 1 oz. vitaminized cereal (proprietary).

Mid-morning.—Milk; 2 breakfast biscuits or rusks.

Lunch.—An average portion of tender mutton or lamb, or chicken, or rabbit, tripe (no onions), brains, or lactic acid cheese (2 oz.); any kind of vegetable purée (that is, rubbed through a sieve); 1 potato well cooked and mashed; butter (size of a walnut); junket or a well-cooked milk pudding with ½ pint of milk; 1 thin slice of buttered dry toast; juice of 2 oranges in water.

Tea.—Very weak, freshly made tea; milk, 5 oz; thin bread and butter; fruit jelly of any kind, but not jam; sponge cake or biscuits.

Supper.—Steamed fish, or scrambled egg, or lactic acid cheese, or milk vegetable soup; 1 mashed potato; butter (piece size of a walnut); 1 slice of thin buttered toast; custard made with 1 egg and 5 oz. of milk, or any well-cooked milk pudding, or milk jelly, or banana or cooked apple, or apricot rubbed through a sieve.

Bedtime.—Warm milk or flavoured milk.

Any patient who has had a gastric or duodenal ulcer should always be very careful about his diet for the rest of his life, and if there is any return of indigestion he should revert to a strict two-hourly diet. People who have had gastric or duodenal ulcers are particularly liable to relapse if they have extra anxieties, responsibilities, or if their meal times are upset by shift work. In these circumstances, always take extra milk between meals so there is never more than two hours without a meal or without milk. Always consult the doctor again if there is a relapse, because he should order you alkaline powder again, and he may be able to help you to ensure a good night's rest. Adequate sleep, frequent, regular, small meals with extra milk, no smoking, are the golden rules for the peptic ulcer patient who is facing a difficult time. Do not put your faith in extra alkaline powder alone.

FINAL DIETETIC RESTRICTIONS

Here are the final dietetic restrictions for the patient who has had a gastric or duodenal ulcer:—

Take your meals regularly and avoid hurrying over them.

Avoid large meals.

Avoid taking a meal when you are tired or when you have cold hands or feet. Lie down, rest and get warm first.

Eat and chew thoroughly.

Milk and Eggs. **Take.**—Milk prepared in any way, junket, custard, well-cooked milk pudding, milk soup; plain cream, ice cream; butter; cream cheese; eggs, lightly cooked, beaten as egg and milk, or as custard.

Avoid.—Ordinary cheese and cooked cheese.

Fish. **Take.**—Fish boiled, steamed or baked, but not fried.

Avoid.—Salmon, sardines.

Meat. **Take.**—Chicken or game, roasted or baked; tripe, brains or sweetbread, well cooked but not fried; mutton, lamb, or beef occasionally, roasted or baked, but not boiled or steamed.

Avoid.—Meat soups and rich gravies, twice-cooked meat, sausages, made-up dishes, pork, high game and all tough meat.

Vegetables. **Take.**—Potatoes well cooked and mashed; cauliflower, spinach, carrots, well cooked and rubbed through a sieve; tomatoes, fresh or cooked if rubbed through a sieve. You may add butter, but do not cook in fat.

Avoid.—Cabbage, peas, beans, celery, onions, watercress and cucumber; fried or chip potatoes.

Fruit. **Take.**- Raw ripe fruit, avoiding pips and skins. If cooked, rub through a sieve; apricot fool, apple meringue, red currant, apple or marmalade jelly are all good.

Avoid.—All pips and skins; raw apple, marmalade with peel, jam, lemon peel, currants, raisins, figs, nuts and all unripe fruit.

Condiments. **Avoid.**—Spices, pepper, cayenne pepper, curries, vinegar, relishes, pickles, chutney and mustard.

Various. **Take.**—White bread, cut thin and toasted dry; any kind of plain biscuit; plain sponge cakes and light Madeira cake without fruit; jellies, plain chocolate, sugar, honey and golden syrup.

Avoid.—All rich pastry and puddings, new bread, brown bread, fruit cake.

Drinking. **Take.** — Water; freshly made weak tea; coffee with milk; fruit juices; milk.

Avoid.—Cocktails, spirits; strong tea, black coffee and cocoa.

Give up smoking if indigestion is present. Smoke less than five cigarettes a day in any case, and smoke after meals only. If possible, avoid smoking entirely.

DIET FOR CONSTIPATION

Most costive patients can be helped by a suitable diet. The majority of constipated people need extra roughage, that is indigestible residue and extra vitamin B1 and extra water. Foods rich in starch are best very restricted, for example, cakes, pastries, rich puddings, new and white bread, potatoes.

On Waking.—Glass of water.

Breakfast.—Stewed prunes, or figs,

or baked or raw apples, with 2 tablespoonfuls of an all-bran cereal, or porridge with 1 tablespoonful of a vitaminized cereal, toast and marmalade, or black treacle; butter, tea or coffee.

Mid-morning. A proprietary product rich in vitamin B, in milk.

Dinner.—Vegetable soup; meat or fish; large helping of cabbage or other green vegetable, with margarine or butter, or salad and mayonnaise; 1 small potato; stewed or fresh fruit, figs, dates, prunes, apples, pears, pineapple, plums, rhubarb, etc.

Tea.—Wholemeal bread and butter, black treacle if desired; watercress, or lettuce and tomato, or raw carrot, or raw brussels sprouts; tea.

Supper.—Meat, fish or egg dish; wholemeal bread; milk pudding.

Bedtime.—Glass of water; raw apple.

LOW RESIDUE BLAND DIET

There are some cases of constipation which are due to the large gut being too spastic, that is, too tight and unrelaxing. Such people pass small, hard stools with much difficulty, and usually suffer from frequent dull abdominal pain, which is due to the spasm of the muscle of the gut. These patients need a low residue bland diet with extra water as follows:—

Early Morning.—Glass of water.

Breakfast.—Strained orange juice; weak tea; well-strained porridge; lightly cooked egg or grilled bacon; white toast, butter; treacle or syrup.

Mid-morning.—A well-known proprietary product rich in vitamin B, in milk.

Dinner.—Tender meat, or steamed fish; small helping of sieved vegetables; mashed potato; milk pudding; baked or stewed apple, sieved apricots, or prunes or fruit jelly.

Tea.—Weak tea; white bread, lactic acid cheese or a well-known proprietary product rich in vitamin B; plain cake.

Supper. — Steamed fish, or egg, poached, boiled or scrambled but not fried; white toast; milk pudding, or mashed banana and cream.

Bedtime.—Glass of milk.

DIET IN OBESITY

Some people will put on weight extremely easily, whereas others can overeat persistently without putting on an ounce, for the latter can burn up their excess food instead of storing it as fat. Obesity seems to be due to the inability to burn up unnecessary food. Many obese people are quite small eaters and take regular exercise.

There is only one way to reduce weight and that is to eat less than the body's basic requirement of energy, and so make it necessary to burn the reserves of fat. Excessive exercise is a poor way of reducing weight, for obese people tolerate exercise badly and by stimulating the appetite make it difficult to restrict the diet. As it may be necessary to diet for several months, the diet must contain enough protein, minerals, and vitamins although it is deficient in energy (sugar and fats).

Obese individuals should be overhauled by a doctor before starting the diet; there are a number of unusual forms of obesity which may require special treatment besides diet.

REDUCING DIET

Breakfast.—Orange juice, 1 oz.; tea, milk to taste, no sugar; egg, or haddock, or one thin rasher of bacon; one thin slice of brown bread with butter very thinly spread.

Dinner.—Lean meat, or fish, or chicken—a good portion; a good plateful of green vegetables or salad; one small apple, orange, pear or grapefruit.

Tea.—Tea, milk to taste, no sugar; two thin slices of brown bread thinly spread with butter; salad as desired.

Supper.—Soup made with the water in which the vegetables were cooked; add 1 teaspoonful of a proprietary vitamin B product; cheese, or steamed fish, or lean meat, or herring, or kipper; green vegetables or salad; one small apple, orange, pear or grapefruit.

Sugar, cakes, pastries, puddings, jam, potatoes or fried food must not be eaten.

DIET FOR HIGH BLOOD PRESSURE

If the patient is over weight he must reduce to normal, for this will lighten the burden on his heart. Any one over weight should carry a stone weight around for a few minutes and this will give some idea of the extra and unnecessary work which his muscles are performing. With high blood pressure, the heart has, anyway, an added burden to undertake. Again, with obesity there is usually an increase of fat in the heart which will hinder its efficiency.

If there is no obesity, there is no special dietetic treatment for high blood pressure unless the kidneys are damaged, and then a low protein diet is advisable. However, moderation in everything should be the rule.

DIET FOR CHRONIC NEPHRITIS

In chronic nephritis, there is much loss of the kidney tissues which are unable to perform efficiently their task of excreting the waste products of the blood. In chronic nephritis there is an accumulation of some of these products in the blood. Urea which is derived from protein is one of these waste products, and so in chronic nephritis we give a low protein diet. It is important rigidly to exclude red meat as this always has a deleterious effect upon the kidneys.

LOW PROTEIN DIET

Breakfast. — 6 oz. of porridge (cooked weight) with 3 oz. of milk, or 1 oz. of a wheat cereal and 5 oz. of milk, or one egg; wholemeal bread, 1 oz. (two thin slices); marmalade, honey or syrup; tea, with 2 tablespoonfuls of milk.

Mid-morning.—Orange juice.

Dinner.—2½ oz. white fish, or 2½ oz of tripe, 2 oz. chicken, rabbit or sweetbreads, herring or salmon, or 1¾ oz. liver; potatoes, green vegetables, except peas, beans or lentils; any pudding made without eggs, milk or gelatine; boiled rice and jam, fruit juice thickened with cornflour, arrowroot, tapioca, suet pudding, pastry or tarts; raw or stewed fruit (not rhubarb); 1 oz. wholemeal bread.

Tea.—Tea with 2 tablespoonfuls of milk; 2 oz. of bread (four thin slices), or shortbread, or buns, or 1½ oz. of biscuits (no cakes made with eggs or milk); salad or fruit.

Supper.—1 egg, or ¾ oz. cheese, or 1 oz. salmon or fresh herring, or 1¼ oz. white fish; potatoes, or vegetables, or salad; 2 oz. wholemeal bread, or 1½ oz. biscuits; fruit and pudding as at dinner if desired.

Avoid.—Meat extracts, meat soups and meat stock; rhubarb, salt meat and salt fish.

This diet allows about fifty grammes of protein. It restricts the chief protein foods, milk, meat, rabbit, fowl, fish, eggs and foods made with eggs. It also restricts to some degree the mineral intake and saves the kidneys the strain of excreting unwanted mineral substance.

DIET FOR HEART FAILURE

If there is swelling of the feet we must limit the amount of fluid and salt, which would otherwise increase the amount of water retained in the tissues. We must give an easily digested diet in small feeds which will not irritate or distend the stomach and so embarrass the heart.

Acute Stage.—Give two- to three-hourly feeds of 2 to 8 oz. as ordered by the doctor of: milk and water; weak tea with milk and sugar; orangeade or other fruit juices with glucose; chicken broth; fruit jellies; eggs and milk; toast or rusk with butter or proprietary product rich in vitamin B, honey or syrup.

As the patient recovers, pass on to a light invalid diet with small meals, and no added salt. It is best to avoid starchy foods, pastry, fried foods, strong tea or coffee, cheeses, pork, sausages—all the indigestible foods.

Breakfast.—Grapefruit with sugar, or sweetened orangeade; lightly poached egg; toast and butter; honey or fruit jelly, or syrup; weak tea or coffee with milk and sugar; vitaminized cereal, ½ oz. with milk.

Mid-morning.—Milk and biscuit.

Dinner.—Steamed fish, or chicken, or tender lean meat, rabbit, or sweetbreads; a little mashed potato; tender greens (small portion); fruit jelly.

Tea.—Weak tea with milk and sugar; toast and butter, honey or proprietary product rich in vitamin B; plain cake.

Supper.—Scrambled egg or steamed fish; toast; baked custard, or jelly, or blancmange.

LOW FAT DIET

This diet is for patients who cannot tolerate fats; children with acidosis, sufferers from migraine, gallstones or jaundice.

We aim to avoid foods that contain fat and to make up the lost source of energy by giving extra carbohydrate. It is necessary to add some concentrated fat-soluble vitamins (A and D).

Breakfast.—Grapefruit with sugar or sweetened orange juice; breakfast cereal with sugar or syrup; lean ham, toast with honey or fruit jelly; tea with skimmed milk and sugar.

Mid-morning.—A well-known proprietary product rich in vitamin B, in water; toast or slice of stale bread.

Dinner.—Boiled chicken or white fish, lean meat, rabbit or tripe; potatoes, green vegetables; sago, rice, tapioca, flavoured with fruit juices or syrup.

Tea.—Rusks or toast, with apple jelly, honey or golden syrup; plain cake or plain biscuits; weak tea with skimmed milk or sugar.

Supper.—Clear soup; fish, etc., as at dinner; potato; raw or cooked fruit, for example, baked apple; blancmange made with skimmed milk; sweet orangeade.

Avoid.—All fried foods, butter, dripping, any fat used in cooking, olive oil, mayonnaise, fat meats, milk except skimmed milk, fat fish, pastry, rich cakes, cocoa, chocolate, nuts.

Take.—Any proprietary preparation of vitamins which will allow 12,000 international units vitamin A and 2,000 international units vitamin D.

DIET IN DIABETES

In diabetes the body is not making enough insulin, which enables sugar to be converted into energy by the body. We can now make up the deficiency by giving artificially prepared insulin. Unfortunately, it cannot be given by mouth as it is destroyed in the stomach, and therefore it is injected under the skin. It is necessary to restrict partially the carbohydrate in the diet, and also to make certain that the same amount is taken every day otherwise we should be unable to strike a balance with the carbohydrate in the diet and the insulin given by injection. The principle is to divide foods into five or ten gramme carbohydrate portions and so many portions are allowed at each meal. The weight of foods containing five grammes of carbohydrate is known and different portions of the same value may be interchanged as desired.

For further details it is best to refer to a special book for diabetics. Your doctor will be able to refer you to a suitable book.

Obese diabetics greatly benefit from weight reduction and the reducing diet already described is suitable. In many diabetics loss of weight has been a feature of the illness and then 100 to 300 grammes of carbohydrates are required.

There are two main varieties of insulin, ordinary soluble insulin which acts for a few hours only, and zinc-protamine insulin which will enable the body to burn sugar for as long as twenty-four hours. Until a few years ago most diabetics had two injections of ordinary insulin daily, but the discovery of the slow insulin has enabled them to have one injection daily of either zinc-protamine insulin or a mixture of zinc-protamine and ordinary insulin.

There are several important rules for diabetics. If they take insulin, they should always carry two lumps of sugar on them. Sometimes, especially after unaccustomed exercise or if too much insulin is given, or there has been too long an interval between meals, the insulin lowers the blood sugar too much and an insulin reaction is caused. Hunger, faintness, giddiness, blurred vision and finally a deep, unrousable sleep may follow, but all these symptoms can be prevented by taking two lumps of sugar at the very onset of the symptoms.

They should keep a card in the pocket stating that the bearer is a diabetic taking insulin, in case they should be caught without sugar, or if the symptoms come on unusually rapidly and unexpectedly.

ILLNESS IN DIABETICS

Never stop the insulin if you are feverish and unable to eat. More insulin is usually required. If you have not been given any special invalid diet take your usual insulin allowance and, also an ounce of glucose with fruit juices and plenty of water every three hours. If unable to keep fluids down take half your usual insulin. *Send for the doctor without delay.* A diabetic who develops an acute infection is particularly liable to pass into a diabetic coma if he omits his insulin.

Take great care of the feet. They are the diabetics' weak spot, for a severe infection may be the consequence of cut corns and a broken skin.

Diabetics must not be regarded as invalids. With insulin and diet they can lead a perfectly ordinary life as a labourer, businessman or housewife.

It is more than probable that at times certain foods mentioned in these diet sheets will be difficult or impossible to obtain. Fresh oranges and lemons cannot always be obtained to make refreshing drinks for acutely ill patients. However, lime juice cordials, orange or lemon squash, lemonade crystals, ginger ale, or essence of lemon, can be substituted. Diabetics or patients on peptic ulcer diet who are unable to get oranges or tomatoes can maintain their vitamin C intake with the synthetic vitamin C tablets which can be obtained from any chemist. Ascorbic acid is the name of the pure chemical vitamin and 50 milligrams (1,000 international units equals one tablet) should be taken daily. For patients with a chronic infection, 100 to 150 milligrams are required daily (two to three tablets).

If it is impossible to provide enough

sugar for some of these diets, remember that glucose is just as good for invalids and may be obtained from chemists. Difficulty in getting extra milk and a supply of eggs and cheese is a serious matter for patients with peptic ulceration. A doctor's certificate will usually help. Brains and sweetbreads are the most satisfactory alternatives for fish for these patients. Again a special doctor's letter may help.

Diabetic patients can always obtain extra meat and fat; in times of rationing their doctor must sign a special form which can be obtained from the local food office.

CHAPTER XII

MINOR ACCIDENTS AND THEIR TREATMENT

by L. COSIN, F.R.C.S. AND S. LEVY, M.B., B.Ch., B.A.

THE title of this chapter is somewhat misleading in that whilst the accidents described are of common occurrence, they may have serious results unless correct treatment is applied. The treatments prescribed do not imply that skilled medical aid can be dispensed with, they are intended that the best possible aid is rendered to the patient until medical aid is available.

Damage to the tissues in which the skin is broken is referred to as a wound. According to the type of damage sustained, wounds are said to be lacerated, incised, contused or punctured. A wound which tears the tissues is known as *lacerated*, whereas the edges of an *incised* wound are clean cut and smooth. If the skin is split and the underlying flesh bruised a *contused* wound is said to have resulted. *Punctured* wounds are characterized by the presence of a puncture wound in the skin.

Whilst the depth of a wound may be obvious, inspection is sometimes misleading; for instance, a small puncture hole in the skin may communicate with a deep track, the depth of which could not be judged by the size of the wound in the skin. So we speak of *superficial* and *deep* wounds. Both types may be of the variety described above. In the latter type damage to important structures may have been sustained, e.g., cut artery or sinew.

1. Hæmorrhage.—Bleeding follows immediately on the infliction of a wound, which, if superficial, is from small blood vessels in and beneath the skin. These vessels are known as capilliaries. The blood is bright red, collects in the wound, and then flows evenly; if left untreated, bleeding ceases in about five to seven minutes. In deep wounds a cut artery will result in bright red blood appearing in spurts; presently these decrease in force so that the blood now flows evenly and finally will clot. Blood from a cut vein is dark blue in colour, flows evenly, and does not tend to clot as readily as bleeding from an artery. Punctured wounds may cause only slight external bleeding because of the relatively small aperture of escape. Blood, however, may accumulate under the skin, producing swelling of the adjacent parts; this phenomenon is seen in punctured wounds of muscular areas inflicted by the entry of, for example, tiny fragments of bomb or shell splinters.

2. Infection.—The healthy and intact skin is an extremely important defence against the entry of germs (bacteria) into the body. Because germs are very widespread in activity all wounds are contaminated by them. They provoke a reaction on the part of the cells of the body in an attempt to eliminate them. Simultaneously other cells strive to repair the damage inflicted by the injury. These attempts at germ destruction and tissue repair constitute a process which is called *inflammation*. This process is likened to a battle in which tissue cells, chemical substances in fluid (serum) oozing from the blood, and white blood corpuscles all combine to attack the germs and to repair damage

Serum and blood corpuscles are carried to the field of battle by blood vessels whose capacity has been increased. Hence the skin around the wound may presently blush and appear swollen. The white blood corpuscles not only form a protective barrier around the wound, preventing germs penetrating deeper into the tissues, but also enter the wound to destroy the organisms. If the wound is only lightly contaminated, the serum alone may be sufficient to wash away and eliminate the germs; in such cases the serum clots forming a scab. Such a scab

Some people faint at the sight of blood. If you have to deal with a fainting fit, lay the patient on a couch, or on the floor, keep the head low, and apply smelling salts or sal volatile on some wool under the patient's nose. When consciousness returns, give cold water to drink. The addition of ten to fifteen drops of sal volatile to a tumblerful of water is a good stimulant. Keep the patient quiet until he is normal again

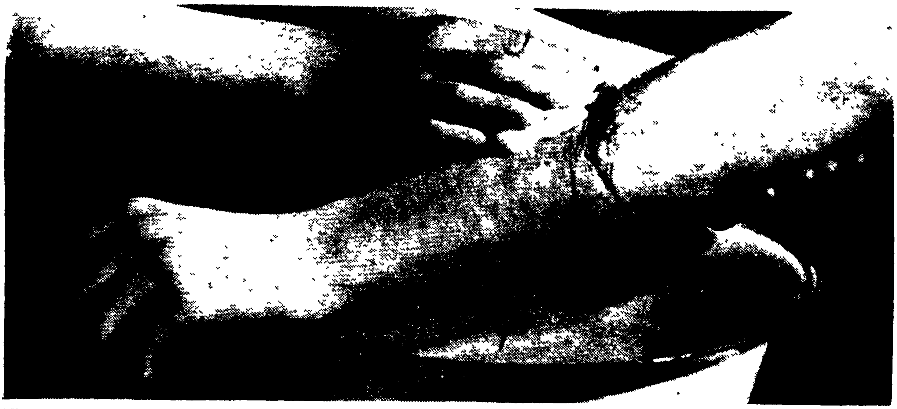
A patient who feels faint should be seated on the ground, and be told to tuck his head between the knees.

therefore acts not only as a natural barrier against the further entry of germs, but allows healing to progress underneath. The discharge of pus indicates that the germs have gained a foothold—even although perhaps temporarily—and that the battle against them is in progress, i.e., the body cells are resisting the invaders.

3. Damage to important structures may occur in deep wounds. In the punctured variety such damage may not be obvious and hence it is always advisable to see a doctor who will investigate this point.

Some people faint at the sight of blood. Let them lie on a couch or bed, keep the head low, and apply smelling salts or the vapour of two or three drops of sal volatile on some wool under the nostrils. This will quickly resuscitate them. When consciousness has returned give cold water to sip; the addition of ten to fifteen drops of sal volatile to a tumblerful of water is an efficacious stimulant. Too much sal volatile in the water will cause vomiting. Keep the patient quiet until he feels quite normal again. These measures are also applicable for fainting from many other causes.

Wounds.—To deal with a wound wash the hands with soap, and if there is capillary hæmorrhage this is easily stopped by applying firm pressure for four or five minutes with a piece of cotton wool, or clean handkerchief, which has been moistened with flavine solution. This is made to a strength of one in a thousand with water. For larger wounds not accompanied by brisk hæmorrhage, wash out any foreign matter, for example, sand or dust,with lukewarm salt water made up to a strength of one teaspoonful to a pint. Then apply a piece of gauze, lint, or clean handkerchief moistened with the flavine solution, cover with wool and bandage evenly and firmly. The firm bandaging will probably be sufficient to stop bleeding. If blood oozes through, apply more wool to the part and bandage firmly again. Should there be spurting from a small artery, firm pressure in the



Treating a Wound (I). *Bathe the wound with lukewarm salt water to cleanse it. Do not use antiseptics. Strong antiseptics will impair the healing powers of the tissues*

Treating a Wound (II). *Apply gauze or lint, or a handkerchief, moistened with flavine.*

Treating a Wound (III). *Cover the first-dressing with cotton wool and bandage firmly. If bleeding is difficult to stop call a doctor. The wound may need stitching.*

manner described above will stop bleeding. Medical aid ought to be sought as soon as possible in case the wound requires to be stitched.

Strong antiseptics, or disinfectants should never be applied to a wound. If flavine solution is not available, salt water or even tap water is preferable to a strong antiseptic. The latter will not kill all the germs; it *will* kill many white blood corpuscles and tissue cells, with consequent impairment of healing, or even an intensification of the infection. Antiseptic ointments are best avoided.

Wounds (e.g., cuts, scratches, punctures) sustained by working in the garden, or if they are contaminated with road dust, are liable to cause lockjaw (tetanus). One should always consult a doctor for what may appear to be a trivial injury in order that measures may be taken to avoid this serious condition developing. This is simply a wise precaution which every one is well advised to take. Tetanus is relatively rare, and there is no need to work yourself up into a state of nerves if you contract such a wound.

When a scab is formed do not disturb it for the reasons already mentioned. Protect it by covering it with a strip of elastic adhesive bandage.

The Scalp.—Bleeding may be profuse, and does not tend to stop spontaneously. It can be controlled with the fingers by putting one on either side parallel to the wound, and applying firm pressure against the skull.

The Lips.—To control brisk hæmorrhage from a cut lip, grasp the lip on either side of the wound between the index finger and the thumb and compress firmly.

Roof of the Mouth.—Do not give mouth washes. Let it clot by itself.

Control scalp bleeding by applying pressure against the skull with the fingers, on either side parallel to the wound.

Palm of Hand.—Apply a flavine dressing to the cut and then ask the patient to grasp firmly a roll of bandage or any other suitable object in the palm of the hand. Bandage the fingers over this and elevate the hand as near the chin as possible by supporting the forearm in a sling. If this fails to stop the bleeding, a tourniquet (*see* PART II, CHAPTER XIII, pages 282-283) may have to be applied to the arm.

A Bleeding Varicose Vein.—This is easily controlled by making the patient lie flat on his back and then elevating the whole limb so that it is now held vertically. A flavine dressing over which wool is applied is now bandaged. firmly to the site. If it is not convenient to put the patient on a bed or lay him down on his back, put him into a chair, or seat him, as shown on page 269.

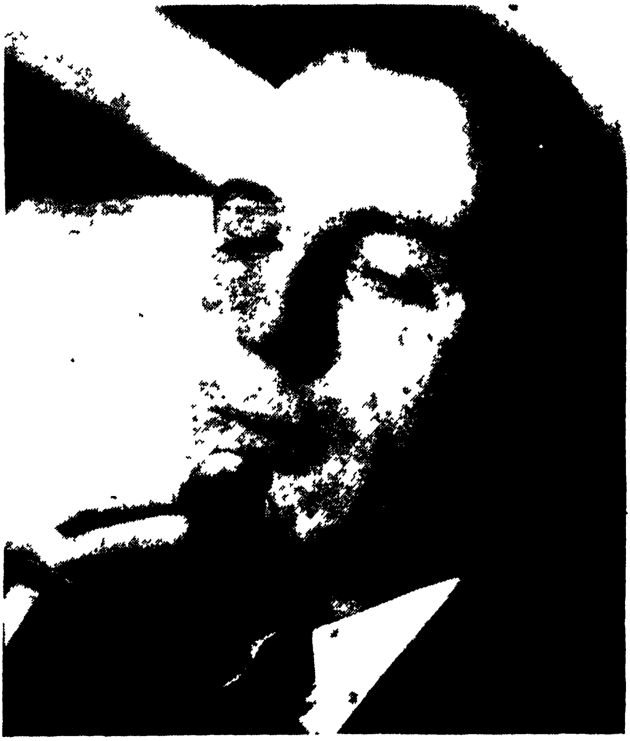
Septic Condition.—When germs have gained a foothold in a wound, the patient may complain of a throbbing pain whilst the affected area may discharge pus. The surrounding skin is red, swollen and tender. In small punctured wounds there may be local throbbing pain, whilst extending upwards from the puncture towards the groin if in the lower limbs, or towards the armpit if in the upper limbs, may be seen bright pink, tender lines. This condition is known as *acute lymphangitis*. The glands in the armpit or groin may be tender and enlarged. In the former type of wound the infection is localized, whilst in the latter the germs have penetrated the defences and are spreading along fine channels (lymphatics) in an attempt to reach the blood stream. If they succeed a serious condition (septicæmia) ensues. Hence lymphangitis is to be regarded as a serious condition. The onset may be initiated by an attack of shivering followed by copious perspiration and a raised temperature.

It must be clearly appreciated that because of grave complications that may follow on sepsis in a wound, treatment should never be carried out except under the supervision of a doctor.

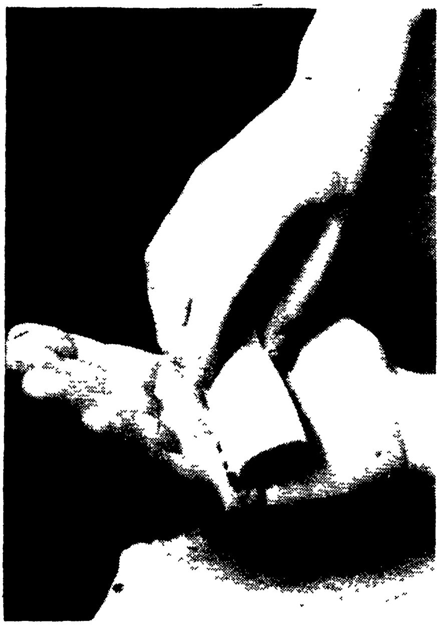
Under no circumstances should a septic wound (boil, carbuncle) be squeezed to evacuate pus. Such a manœuvre may destroy the protective barrier, which is in process of formation, or has already been formed, and so allow organisms to penetrate deeper into the tissues.

Physical rest is an important aid to the body defences. If a raised temperature exists, rest in bed is advisable. Local rest is obtained by putting the arm in a sling; if a lower limb is affected, it is best to rest in bed.

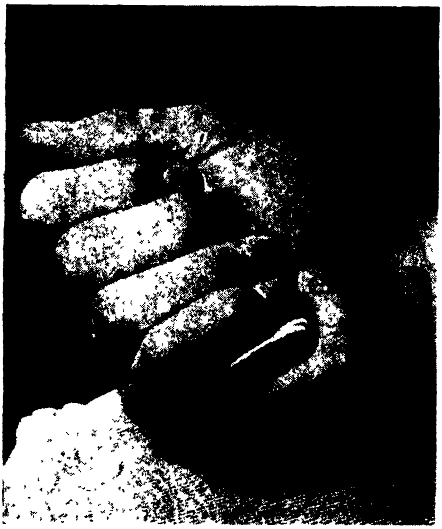
To diminish the effects of poisons on the system, copious draughts of fruit drinks (e.g., diluted orange juice, lemon juice, and grape fruit juice) are very useful. Glucose or sugar added to these enhance their value, whilst a dash of soda water improves their taste. The juices of tinned fruits (for example, pineapple) serve very well.



Control brisk bleeding from a cut lip by grasping the lip on either side of the wound between thumb and index finger as shown in the photograph above and compressing firmly.



If the palm of the hand is cut, apply a flavine dressing. Then place a roll of bandage or any other suitable article that will make a firm pad on the injured palm of the patient (see photograph above).

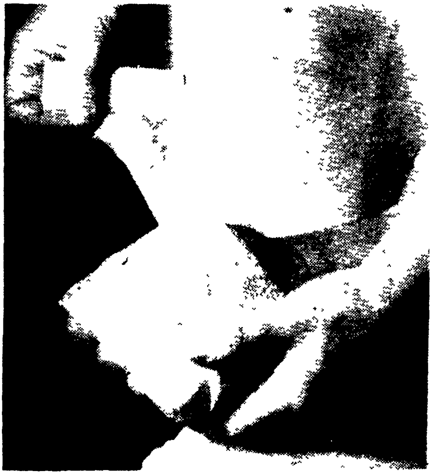


Now ask the patient to grasp the bandage firmly (see above). Bandage over the closed fist (see photograph on right).

A light nourishing diet is best. If the doctor has ordered sulphanilamide or sulphapyridine (M. & B. 693) tablets for the patient, he may advise against the patient having eggs.

Hot fomentations may be ordered (*see* CHAPTER VII, page 214), but they are not always advisable since the heat lasts at most about twenty minutes, and a soft sodden skin results from the moisture.

Poultices also may be prescribed, particularly in closed septic wounds (e.g., boils). Bread poultices are to be condemned since they may introduce infection. Suitable substances for poultices are kaolin or antiphlogistine (*see* CHAPTER VIII, pages 120 and 228).



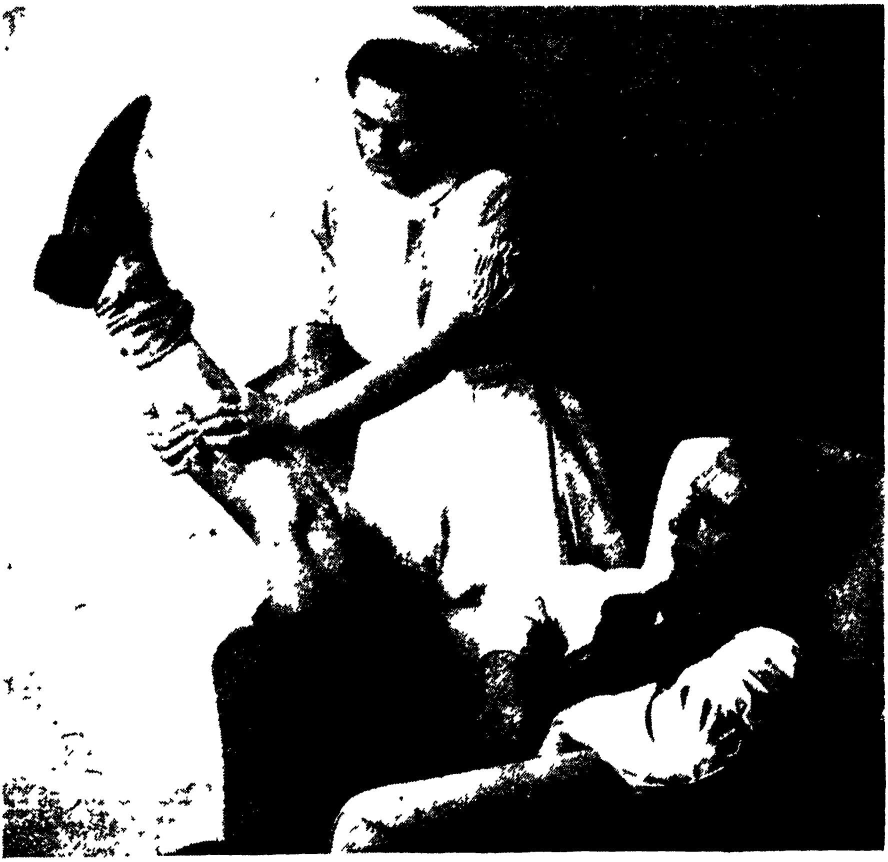
After bandaging, elevate the hand as near the chin as possible in a sling.

Gauze wetted with saturated sodium sulphate (Glauber's salt) solution and applied frequently or impregnated with a paste made of glycerine and Epsom-salt are highly satisfactory methods of treatment.

Bruises.—Damage to blood vessels in and beneath the skin following a blow from a blunt object will produce a bruise. A common form is the black eye. The effused blood then produces swelling and purplish mottling. Some people bruise more easily than others. Unless the skin is broken, bruises are of little consequence although there may be some local-tenderness. Germs may enter if the skin is broken, causing an abscess. It is important to realize that following an injury, e.g., twisting the ankle, bruising may appear around the ankle a day or two afterwards, and may spread on to the foot or up the leg. The delayed appearance of a spreading bruise may be the result of a crack in the bone. So if in doubt about the cause of a bruise, see a doctor.

If the skin is broken, treat as a simple wound. If seen immediately after the onset with the skin intact, apply a cold compress. Do this by soaking lint or a clean handkerchief in cold water (preferably iced), wring out, but leave moist, apply to the affected area and bandage firmly over wool. Repeat this often, and in this way the effusion of blood and subsequent swelling and pain will be diminished. If treatment is not commenced until a few days have elapsed, hot fomentations instead of cold compresses will hasten recovery.

Grazes.—These occur over the knee



In the case of a burst varicose vein, if possible lay the patient flat, elevate the limb, as shown, and control the bleeding by direct digital pressure. Apply a dressing, and bandage.

A bruise should be treated by applying a cold compress—that is, lint or a handkerchief wrung out in ice-cold water—to the affected area. Bandage over cotton wool.

caps in children, or on the face and hands due to friction against the ground. There is a gentle oozing of blood from the grazed surfaces.

Grazes heal without any trouble if they are first cleansed by washing gently with gauze or lint soaked in salt water (one teaspoonful to a pint) or flavine (one in one thousand). On the face, this is all that is necessary since a scab will rapidly form under which healing will occur. In young children it is expedient to protect the area after washing, with dry gauze and a bandage or adhesive strapping. The dressing is not touched for seven to ten days, and then a healthy scab will have formed. Should pain ensue after two or three days, the dressing should be removed to discover if sepsis has supervened; if it has, a doctor should be consulted.

Burns and Scalds.—Damage to tissues by dry heat is called a burn; moist heat (e.g., boiling water or steam) produces a scald. The treatment for both, however, is the same. Strong acids (e.g., spirits of salts), alkalis and disinfectants will also cause burns.

A slight burn produces reddening of the skin, which feels hot and painful. Severe burns of the skin are more painful and blisters containing clear fluid appear.

Of course burns may produce charring of the tissues, but this type will not be discussed here.

Infants who may be accidently scalded must be regarded as being dangerously ill; the severe shock which they suffer may prove rapidly fatal. Urgent medical aid is imperative.

A burn is a wound; hence it is important to prevent it becoming septic. Do not put flour or oily preparations, e.g., carron oil, on it. For this reason also it is wisest to see a doctor; if medical aid is not readily available proceed thus:—

Reddening of the skin as the result of a burn or scald is best dealt with by smearing the area with a tannic acid or flavine jelly. Cover the area with gauze or lint and bandage lightly. If such a

A chemical burn should be bathed in an alkaline solution, such as soda bicarbonate, if caused by acid; if by an alkali, bathe in acid solution. For a simple burn apply tannic acid or flavine solution, cover the area with gauze and bandage lightly.

jelly is not available, gauze soaked in flavine solution or cold strong tea may be used as a first aid measure.

If the blistered area is large, the patient will be shocked. Send for medical aid immediately. In the meantime, wrap the patient up warmly in blankets and give warm sweet drinks copiously, e.g., tea or milk sweetened with sugar or glucose. Do not immerse a scalded child in a warm bath; remove any wet clothing before the warmth of a fire, dry the skin rapidly but gently, and wrap the child up in blankets.

A single blister may be dealt with by applying flavine solution in gauze or lint, or smearing lightly with flavine jelly over the affected area. Cover with wool and bandage lightly.

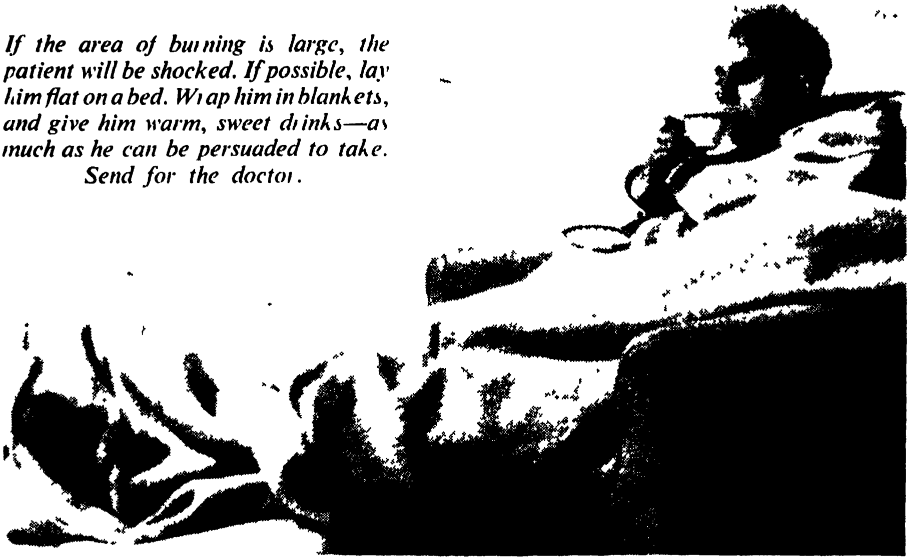
Acid burns are washed with a dilute alkaline solution, e.g., two teaspoonfuls of soda bicarbonate to the pint of water, and vice versa dilute acids, e.g., one part of vinegar to two parts of water, are used for washing alkaline burns. If it is not known whether the burn is due to an alkali or acid, wash the part freely with cold water. Finally, apply flavine solution or jelly to the part, cover with wool, and bandage.

Wrenches and Sprains.—A sudden wrench of a joint may overstretch or tear a ligament attached to the bones forming that joint. Commonest are the wrist and ankle. Sudden pain is felt in the joint, but mainly in the damaged ligament. Movements of the joint which tend to stretch the affected ligament will immediately increase the pain. Swelling appears quickly, and if the ligament is torn a bruise will appear within a few days.

A crack in a bone may very closely resemble a sprain; your doctor will advise you about this.

Rest the limb in the most comfortable position on a pillow. Apply a folded handkerchief or a piece of lint wrung

If the area of burning is large, the patient will be shocked. If possible, lay him flat on a bed. Wrap him in blankets, and give him warm, sweet drinks—as much as he can be persuaded to take. Send for the doctor.



out in ice-cold water, or industrial spirit, over the most tender area. Cover with a thin layer of cotton wool and bandage evenly and firmly. Bandaging is designed to slacken the ligament, or bring the torn ends together. Thus if the inner side of the ankle is the seat of the trouble, apply the free end of the bandage to the middle of the outer margin of the foot. Hold it there firmly and draw the bandage across the sole of the foot, then over to and around the outer aspect of the ankle. Then come around to the inner side of the ankle and over to the starting point. Draw the bandage taut and repeat this "figure of eight" three or four times. Apply a layer of cotton wool on each complete figure of eight, and draw each layer of bandage more firmly than the last. This manœuvre lessens swelling, and turns the ankle inwards, thereby easing pain and promoting more rapid healing. Do not let the patient walk about in a soft slipper. Elevate the limb on a cushion on a chair or keep the forearm in a sling.

A wrench of the knee joint frequently damages the cartilage on the inner side of the knee joint. The patient experiences a sudden sickening pain in the joint, which swells rapidly. The knee may lock, i.e., it may be impossible to straighten the leg.

Until medical aid arrives, apply a cold compress to the knee and bandage over wool, and rest the limb in the position which is found to afford the maximum comfort.

Strains.—The term is frequently applied by patients to a rupture at the groin or navel, which after sudden exertion fails to disappear even on lying down. The lump which forms is painful and tender.

This is an extremely serious condition. Summon a doctor immediately. In the meantime let the patient lie on his back with the head and shoulders raised on three pillows. Put two pillows under the buttocks and see that the thighs are bent up. Pain may be temporarily eased by applying a properly protected hot-water bottle to the area. Be most careful not to burn the skin.

Muscle Strains.—These result from

torn or overstretched muscle fibres.

Following a sudden exertion, there is sudden pain over the affected muscle fibres, which are also tender. Any movement which tends to stretch the fibres will increase the pain.

Rest the muscle by avoiding movements which increase the pain. Hot fomentations or a kaolin poultice will ease pain. Alternatively, adhesive elastic strapping firmly applied will ease pain.

Foreign Bodies in the Eye.—Tiny pieces of grit may be blown into the eye, and come to rest on the eyeball.

The patient complains of a pricking pain in the eye, screws up the lids, and tears overflow on to the cheek.

A magnifying glass is useful for inspecting the surface of the eye for tiny foreign bodies.

Instruct the patient to avoid rubbing the eye. Young children may have to have their hands tied down.

Separate the lids with the index finger and thumb. Inspect the surface of the eyeball in a good light. If the foreign body is seen, wisp it off with the corner of a handkerchief.

If the foreign body cannot be seen on the surface, evert the lower lid. The patient is told to turn the eye upwards, the lower lid being drawn downwards with the pad of the index finger.

The foreign body may be under the upper lid. Pull the upper lid downwards and forwards by means of the eyelashes; push the lower lid upwards so that the upper overlaps it. Let go both eyelids; the lower lid eyelashes will then brush the under surface of the upper lid. If necessary do this two or three times. If unsuccessful in dislodging the foreign body by this means, evert the upper lid. Sit the patient on a high-backed chair. Stand facing the patient, and instruct him to turn his eyes down towards his feet. Grasp the upper lid eyelashes between the right index finger and thumb. With the nail turned downwards, apply the tip of the left thumb firmly but gently against the base of the upper lid. Pull the lashes forward and upwards over the free edge of the nail. The whole of the under surface of the upper lid will now be brought into view.

Foreign Bodies Embedded in the Eye.—Tiny particles of steel or other sharp particles may become embedded in the eyeball.

The patient must not be allowed to rub the eye. Do not make attempts at removal; put a drop of castor oil or liquid paraffin in the eye, cover with a pad of wool, and bandage lightly. Send the patient at once to a doctor or to hospital.

Hæmorrhage on the Surface of the Eyeball.--A bout of coughing may

For a sprain, apply to the most tender part of the affected area a folded handkerchief, or a piece of lint wrung out in ice-cold water. Then cover the cold compress with a thin layer of cotton wool and bandage over this dressing evenly and firmly.

burst a small blood vessel over the surface of the eyeball, producing a bloodshot eye.

No interference with the sight of the eye need be feared; the blood will be completely absorbed.

Immediately this accident is known to occur, apply cold compresses to the eye several times a day for two days. Then change over to bathing the eye with warm water. Do this by wrapping a clean piece of lint, or a handkerchief, over the bowl of a wooden spoon; immerse this end in warm water and apply to the eye.

To irrigate the eye, get the patient to hold a dish against the cheek. Turn the head slightly over to the side of the eye to be irrigated. Separate the eyelids, and run the fluid gently and evenly on to the eyeball.

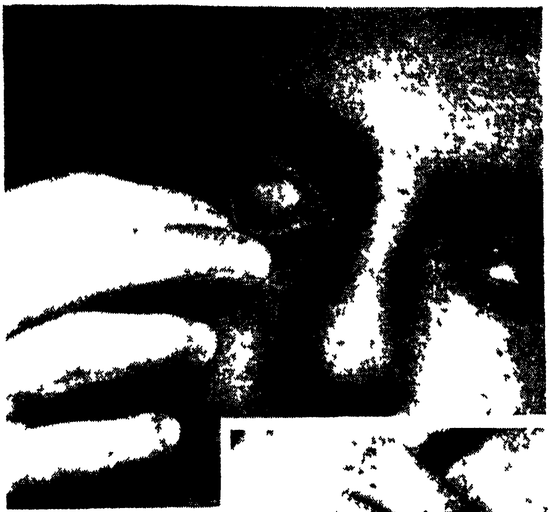
Corrosives in the Eye.—Splashing of corrosives into the eye is a serious accident if not dealt with promptly. There is a burning pain in the eye, and the lids are screwed up.

If the corrosive is known to be an alkali, irrigate the eye with an acid solution, for example, equal parts of water and vinegar. Conversely acid burns are treated with water to which two teaspoonfuls of soda bicarbonate to the pint have been added. Finally, wash the eye with plain water to remove the excess of vinegar or soda bicarbonate. Apply a wool pad; bandage lightly, and see a doctor immediately.

Quicklime burns are treated by first brushing away as much of the lime as possible, and then irrigating with a solution of ammonium chloride (four per cent) or ammonium tartrate. If these solutions are not available, irrigate with dilute vinegar or cold water. Apply a wool pad, bandage lightly, and see a doctor.

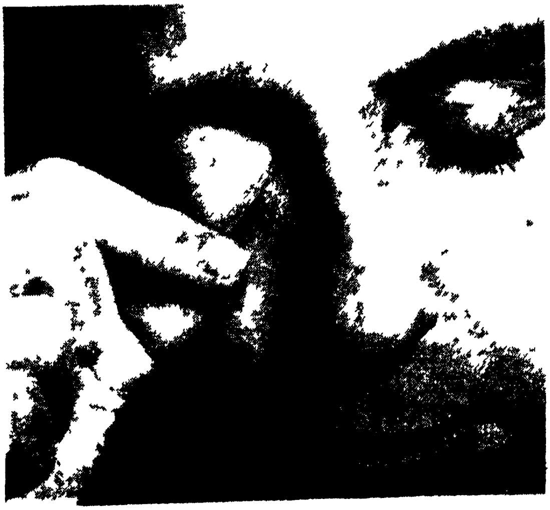
Irrigation of the Eye.—The patient lies on a couch or sits on a high-backed chair. Coil a towel under the chin and around the neck. The patient holds a kidney tray or other suitable receptacle against the cheek. The head is rotated slightly over to the side of the eye which is to be irrigated. The eyelids are separated with the left index finger and thumb, whilst the irrigating fluid is run on to the surface of the eyeball from an undine. A small jug or teapot may be used. Grasp the undine in the palm of the hand, put the pad of the index finger over the inlet, and hold the spout near the inner angle of the eye. Tilt the undine, slowly raise the index finger and a steady stream of fluid will run on to the surface of the eyeball. If the spout is held too far from the eye, or if the index finger is lifted suddenly, the sudden impact of the fluid on the eye will cause discomfort. For the same reason the flow should be an uninterrupted stream, not a spasmodic succession of small drops.

Foreign Bodies in the Ear.—Small objects are pushed into the ears by



Left Everting the lower lid The patient is told to turn the eye upwards The lower lid is drawn downwards, as shown, with the pads of the index and second finger

Right Everting upper lid The patient must turn his eyes downwards Grasp the upper lid lashes With nails turned downwards, pull the lashes forwards and upwards The whole of the under surface of the upper lid can now be seen



Left If the foreign body is under the upper lid, pull it downwards and forwards by means of the lashes so that it comes over the lower lid Let your grip go, the lower lid lashes will brush the under surface of the upper lid.

children. Do not attempt to remove these yourself since you may push the object farther in and damage the drum. Take the child to a doctor. Insects or light foreign bodies may be removed by running in lukewarm olive oil or liquid paraffin. The affected ear is held upwards by resting the head on a pillow, the oil is run out and the insect will then float out with the oil.

Bleeding from the Ear.—Do not plug the ear channel with wool. This advice applies in every case of a discharging ear. Do not syringe the ear. Apply a cotton wool pad lightly to the ear. bandage, and see a doctor immediately.

Foreign Bodies in the Nose.—Children push beads, peas and other small objects in through the nostrils. Instruct the patient to take a deep breath through the mouth. Compress the unaffected nostril and ask him to blow forcibly through the nose. If unsuccessful in dislodging the object take the child to a doctor.

Foreign Bodies in the Throat.—A fish bone is commonly held up either in one of the depressions of the tonsils or else in a cul-de-sac behind the tongue.

The bone may pass down into the gullet and scratch the throat en route. The patient may choke and have a sharp pricking in the throat.

Ask him to wash his mouth out with a glass of water. With the mouth wide open illuminate the patient's throat with a torch or by holding his mouth to the light. Tell him to continue breathing rhythmically and deliberately. Unless he does this he may feel that he is going to choke; examination is then difficult. Depress the tongue with the handle of a tablespoon. If the bone is lodged in the tonsil it may be seen and plucked out. If the bone cannot be seen let the patient rest for a moment or two, then instruct him to open his mouth widely and to put out the tongue. Now rapidly insert the index finger to the back of the tongue into the cul-de-sac. If the bone is felt, it may be hooked up to the mouth with a finger. If it still cannot be felt, consult a doctor.

Children frequently swallow foreign bodies, for example, coins, beads, pins, etc. Do not give the child an aperient or try to make him sick. Oatmeal porridge may be given, but consult a doctor immediately.

Smaller bodies, for example, orange pips, may be inhaled into the lung. The child has a fit of coughing, looks blue and will tend to continue coughing. Take the child to a doctor immediately.

Float out foreign bodies by running lukewarm oil into the ear, which is held upwards for a minute on a pillow. The oil is run out and the foreign body will float out with it

If medicinal pills or tablets or the contents of a medicine bottle have been accidentally swallowed put two fingers into the mouth, irritate the back of the throat, to induce vomiting. Save the vomit for examination by the doctor.

Save also the box or bottle which contained the medicine

Adults may accidentally swallow small sharp fragments of bone, for example, rabbit or mutton, or even a denture If the object can be seen at the back of the throat attempt to extract it as described for fish bones If it cannot be seen, and the patient complains of a choking sensation, thump him vigorously on the back between the shoulder blades This may dislodge the object If unsuccessful medical aid should be sought immediately

Stings and Bites.—A wasp or bee sting is a punctured wound into which an irritating fluid has been injected There is pain at the site of the sting with subsequent swelling

If the sting occurs in the mouth, extensive swelling with obstruction of the windpipe inlet may occur rapidly The breathing will then become stertorous Give the patient ice to suck or cold water to drink and take the patient to a doctor or hospital immediately For bee stings elsewhere, swab the area with methylated spirit, extract the sting, if present, with a needle, the point of which has been flamed, and apply sal volatile on wool Soda bicarbonate dissolved in water or the moist blue bag are useful alternatives

Wasp stings are treated similarly, but use vinegar, or the juice of an onion instead of the alkalis

Mosquito bites are best treated by covering them with lint or gauze soaked in a saturated solution of Epsom-salt or Glauber's salt

Stings, particularly on the face, should never be scratched, they may go septic with serious results

Plant stings are treated with soda bicarbonate solution or the moist blue bag

Splinters.—If penetration under the nail is deep a doctor should deal with this, since attempts at extraction are nearly always unsuccessful A splinter embedded under the horny layer of the skin can be extracted by first swabbing the skin with methylated spirits and gently opening up the overlying horny skin with a point of a needle which has been flamed

Needles entering the flesh frequently break off leaving a portion embedded Medical aid should be sought A fishhook is extracted by cleaning the skin

If an object lodges in the throat, and the patient complains of choking, thump him vigorously on the back between the shoulder blades. This may dislodge the object.

over the point and the portion of the hook jutting out with spirit. Depress the eye of the hook so as to push the point and barb through the skin. Clip this portion off and withdraw the shaft of the hook. Apply a flavine dressing.

Poisonous Bites by Dogs and Snakes.—Bites by rabid dogs are practically unknown in England. The wound should be treated as a simple puncture or laceration, that is, apply a flavine dressing. See your doctor in case a stitch is necessary. Strong caustics are painful and delay healing.

The adder bite is more common and usually consists of one or more punctured wounds on the hand or in the neighbourhood of the ankle.

In addition to the symptoms of poisoning which usually develop, the patient is always suffering from shock due to fear.

Lay the patient down, and immediately stop the circulation in the affected limb by applying a constricting band to the arm or thigh. The constricting band can be improvised by using a cord, braces, etc. Apply dilute potassium permanganate solution to the wound, that is, two or three crystals dissolved in a tumblerful of water. It is advisable to summon medical aid immediately.

CHAPTER XIII

SOME SERIOUS EMERGENCIES

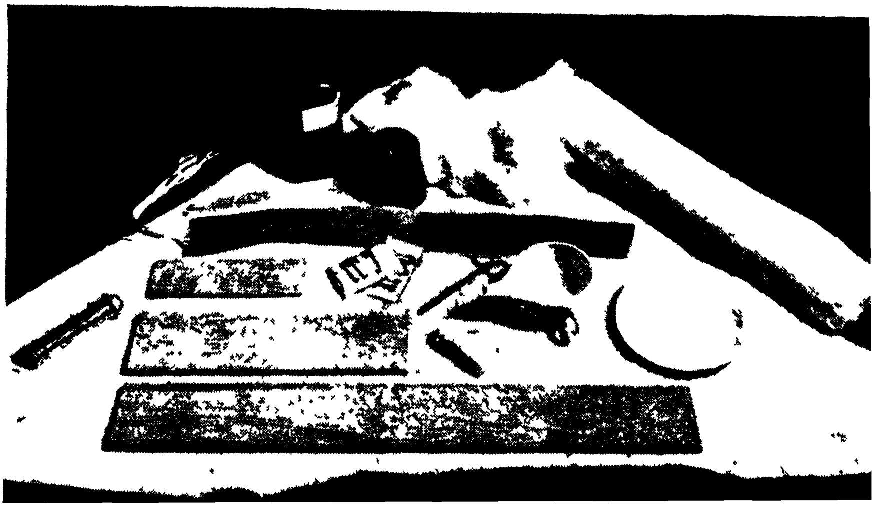
by L. COSIN, F.R.C.S. AND S. LEVY, M.B., B.Ch., B.A.

PROMPT and efficient first aid will often save a patient's life. Even if the patient's life is not urgently threatened, such aid will help the patient to make a more rapid recovery. The methods of treatment outlined here are to be employed until medical aid is available. It is not intended that the first aider is to assume the responsibilities of the doctor; he must render the patient the best possible aid until the doctor arrives, or until the patient can be got to hospital.

Types of Hæmorrhage.—Bleeding on to the exterior, that is, visible bleeding, is called *external hæmorrhage*, whilst *internal* or invisible bleeding may occur from, or into, an organ or cavity of the body; for example, a ruptured spleen spills blood into the abdominal cavity. External bleeding is commonly the result of wounds.

The cause of internal hæmorrhage must be inferred from certain signs and symptoms, whereas external hæmorrhage is readily seen. The bleeding, of course, may be from an artery, vein, or capillary, or more commonly from all three types of vessel at once.

The effects of hæmorrhage depend mainly on the rate and volume of blood loss, and of course, any other



The necessities for a first-aider. You can see here: a bottle of flavine, cotton wool, a roll of lint; sticks for splints, a tourniquet, a "professional" tourniquet, a hand splint, arm splint, leg splint; a torch, safety-pins, scissors, bandage; feeding cup, saucer and sling.

associated injury, as a fracture. A rapid loss is more serious than a slow loss, and constitutes an immediate threat to the patient's life.

If the injury is severe, shock will also be severe, and will be intensified by the hæmorrhage. If the injury be slight, but hæmorrhage continuous, then shock will appear as the direct result of the bleeding itself.

PROGRESSIVE HÆMORRHAGE

Progressive hæmorrhage may be deduced from the following signs and symptoms. The skin and lips become progressively paler. The normal adult pulse rate of seventy to eighty a minute increases to one hundred or more a minute. In the later stages the pulse at the wrist may be difficult to feel. The breathing rate also increases from the normal rate of eighteen breaths per minute. In addition, the breathing may be shallow, or sighing, and if much blood has been lost the patient may clamour for more air. The patient may complain of seeing black specks before the eyes, of faintness, or even buzzing or banging noises in the ears. As hæmorrhage progresses the skin becomes cold and covered with a cold sweat. Consciousness may be lost or the patient be restless. Total collapse is then imminent. Treatment is directed to the control of the hæmorrhage at the earliest possible moment.

If internal hæmorrhage is suspected send for a doctor immediately. This type of hæmorrhage commonly occurs as the result of street accidents—of being run over. In the home a pregnancy situated outside the womb sometimes ruptures into the abdominal cavity about the third month of pregnancy, producing sudden abdominal pain, accompanied by the signs and symptoms of internal bleeding already described.

At home, lay the patient flat on a bed or couch and insist on complete rest and relaxation. Movement increases the blood pressure to a large extent,

Treatment for shock. Put your patient to bed immediately, if possible. Keep him warm, and give him abundant hot drinks. Elevate the foot of the bed as shown.

and so increases the rate of blood loss.

Give ice chips to suck or small sips of cold water. Do not give alcohol, hot drinks, or abundant fluids by mouth. The patient may be bleeding into the stomach, and fluids will induce vomiting and so intensify shock.

Remove all tight clothing from the neck, chest and waist, but take particular care to see that the patient is kept warmly wrapped up. Use hot-water bottles if necessary.

Elevate the foot end of the bed by resting the cross bar on a chair, or placing books under the castors so as to give an elevation of up to ten inches.

Make a written note of the pulse rate and count it every fifteen minutes; hand this record to the doctor.

In the street the patient must be kept warm and quiet until removed to hospital. The patient is, if possible, brought to shelter and covered in coats, rugs, etc. If hot-water bottles can be borrowed they will be of great advantage. Urgent steps are taken to get the patient to hospital as quickly as possible.

Similarly, for *external hæmorrhage*, a doctor is immediately sent for.

Expose the site of the hæmorrhage adequately by gently removing or cutting, with a pair of scissors or penknife, the overlying clothing. When this is done immediately control the hæmorrhage. This can be done by digital pressure, a pad and bandage, or a tourniquet. These methods will be described in detail presently.

If a limb is broken, splint it (described later) and then rest the patient on a bed or couch. Give the patient abundant fluids to drink. Either hot sweet drinks (tea, coffee or milk) or cold water may be given.

Keep the patient warm and quiet, and elevate the foot end of the bed as already described.

CONTROLLING HÆMORRHAGE

Direct Digital Pressure. — If the bleeding point is clearly visible it can be compressed by firm pressure with the clean finger or pad. Press firmly for seven or ten minutes; this will aid the blood at the broken end of the artery to clot and will also allow the hole in the artery to shrink. Bleeding may then be not so forceful, or may have ceased, and a pad and bandage can be applied. If the bleeding is still copious after ten minutes of efficient pressure try indirect digital pressure. Venous hæmorrhage is easily controlled by pressure.

Indirect Digital Pressure.—Sometimes the bleeding point is inaccessible, or several branches of the artery in the wound may be bleeding. Pressure of the main artery of supply against the adjacent bone will stop, or greatly lessen, the loss of blood. The selected point at which pressure is applied is one at which the artery is closest to the bone and is not covered over by a great thickness of muscle; it will, of course, be situated in the limb *between the trunk and the wound.* Only two arteries will be considered, viz.: the brachial and the femoral arteries.

The brachial artery is the main artery of supply to the upper limb. It enters the arm at the armpit, runs downward along the inner aspect of the upper arm roughly in line with the seam on the inner side of the coat sleeve, and at the elbow joint it splits into two branches. Bleeding in the palm of the hand, forearm and arm can be controlled by pressure of the brachial

Direct digital pressure. The bleeding point is compressed by firm pressure over, if possible, a pad. If this does not succeed in seven or less minutes, apply a tourniquet and bandage the wound.

artery firmly against the bone.

The femoral artery is the main artery of supply to the lower limb; its pulsations may be felt in the centre of the groin fold. Pressure at this point directed backwards and slightly outwards will compress the vessel against the neck of the thigh bone and so control hæmorrhage below that point. Lower down in the thigh the vessel is covered by thick muscles making pressure there ineffective.

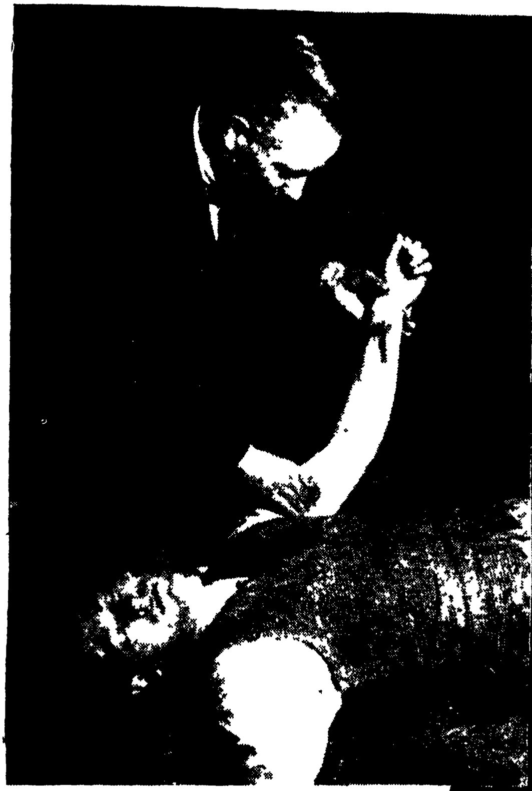
Whilst a vessel is being compressed, if someone else is available, a pad and bandage ought to be applied to the wound.

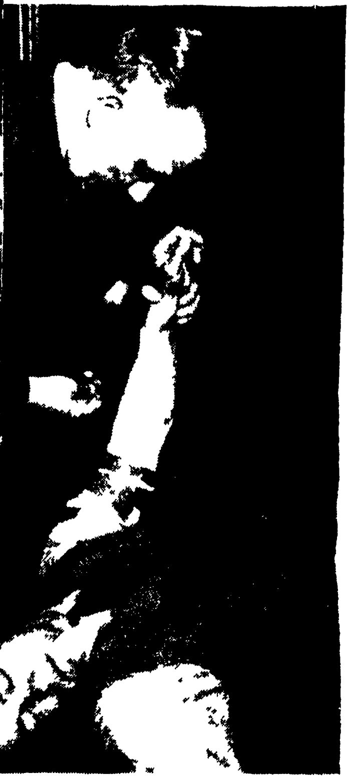
Pad and Bandage.—This is the ideal treatment for several reasons. First, it can be used whether the exact origin of bleeding in the wound is evident or not. Secondly, most arterial hæmorrhages can be controlled in this way, whilst associated venous hæmorrhage will always be controlled by this method. Finally, contamination of the wound by germs is minimized. The only disadvantage is that clean gauze, lint, wool, or bandages may not be at hand. But clean handkerchiefs, towels and strips of linen are available in nearly every home.

If there is time wash the hands with soap and water. Take a piece of gauze, lint, or a clean handkerchief, large enough to overlap the wound. If possible wring this dressing out in one in one thousand watery solution of flavine. Place this dressing over the wound and cover with a good thick pad of cotton wool. Bandage over this evenly and firmly. Place a pad of cotton wool over the wound site on top of each successive layer of bandage for three or four layers. When doing this draw each layer of bandage a little tighter than the last layer, but do not attempt to do this after wool has ceased to be applied or else the limb may be constricted. Then apply the general measures of treatment as already indicated for external hæmorrhage (*see* page 280).

Pad and bandage: Cover the wound with gauze, lint, etc. Pad with cotton wool and bandage over it. Place pad of cotton wool over wound site and bandage again. Make three or four layers in the same way, drawing each layer of bandage a little tighter.

Tourniquet is a band which when tightened will constrict a limb with consequent compression of the blood vessels, and of course all the other important structures in the limb, for example, nerves and sinews. Standard types of tourniquet may be bought. One can be made by cutting a strip thirty inches long and three inches wide from a discarded inner tube of a motor car tyre. The strip is first thoroughly washed with warm soap





Tourniquet on the arm to compress brachial artery. The wound is near the wrist, and indirect digital pressure (left), that is, on the brachial artery, is first used until a tourniquet can be applied (right). Notice the padding between tourniquet and skin, and also that the period of application of the tourniquet should be observed.

and water to remove all dirt and grease. Then sew on to one end two pieces of tape each twelve inches long; arrange them so that they are parallel to each other and overlap the rubber by three inches. The band is kept rolled up with the tapes inside; a small elastic band slipped over it will prevent it from unrolling itself.

Improvised tourniquets may be made of a bicycle tyre inner tube, braces, cord or linen bandage, etc.

When applying a tourniquet, place a layer of wool, or a piece of lint, or a portion of clothing, for example, sleeve or trousers, between the tourniquet and the skin. This tends to avoid pinching of the skin and diminishes pain when the band is tightened.

If the home-made tourniquet (already described) is used see that each turn of the band is accurately applied over the preceding turn of the band.

Improvised tourniquets can be tightened by using the principle of the Spanish windlass. Secure the tourniquet with a reef knot but arrange the length so that it will fit only loosely after the knot has been secured. Now insert a firm stick about four inches long under the tourniquet. By rotating this stick around the band, considerable tension can be applied.

A tourniquet may save a life but it may also lose a limb. Whenever possible, therefore, try to stop bleeding by the other methods already described. In general, the use of a tourniquet is indicated: (*a*) when other methods fail to control bleeding; (*b*) when the patient has already lost so much blood that any further loss would endanger his life; (*c*) when a limb has been so mutilated that it will almost certainly require amputation.

APPLYING A TOURNIQUET

The site of application must be to the upper arm, or to the thigh; never apply it to the forearm or leg. If the constriction is not sufficiently tight, the veins under the tourniquet are occluded and the arteries only partially compressed; bleeding from the wound will thereby be encouraged. If the constriction is applied for a mangled limb, apply it as near the injury as possible and do not release at all. If applied for hæmorrhage, however, make a note of the time of application and release the tourniquet for thirty seconds every fifteen minutes. Always make certain that the knot is securely tied, lest it slips whilst the patient is en route for hospital or home; aid may then not be available.

We have indicated that there are serious disadvantages in using a tourniquet. It causes pain which is more severe if a narrow bandage is used and the tighter it is applied. On the other hand, if the band is too wide or not drawn tight enough, hæmorrhage will not be controlled. Since the object of the tourniquet is the arrest of the circulation in the limb, death of the distal portion, that is, gangrene, may follow. Sometimes even if the whole limb does not become gangrenous, certain important structures, for example nerves, may be so damaged as to cause a permanent or partial paralysis of the limb. So again let us repeat, only use a tourniquet as a last resort. Do not apply heat to the affected limb because warmth may bring on gangrene.

SPECIAL TYPES OF HÆMORRHAGE

Hæmatemesis. — Vomited blood may appear as coffee grounds, or if more copious, as dark red blood. There may be an admixture of partly digested food. Save the vomit for the doctor's inspection and employ the measures outlined for internal hæmorrhage.

Hæmoptysis.—Coughed up blood is bright red in colour and frothy. Prop the patient up in bed with pillows, save the coughed-up specimens for the doctor; in the meantime while waiting for medical aid treat the patient for internal hæmorrhage.

Bleeding from the Anal Orifice may appear as bright red blood streaking the motions, or may be more profuse. *Consult a doctor immediately.*

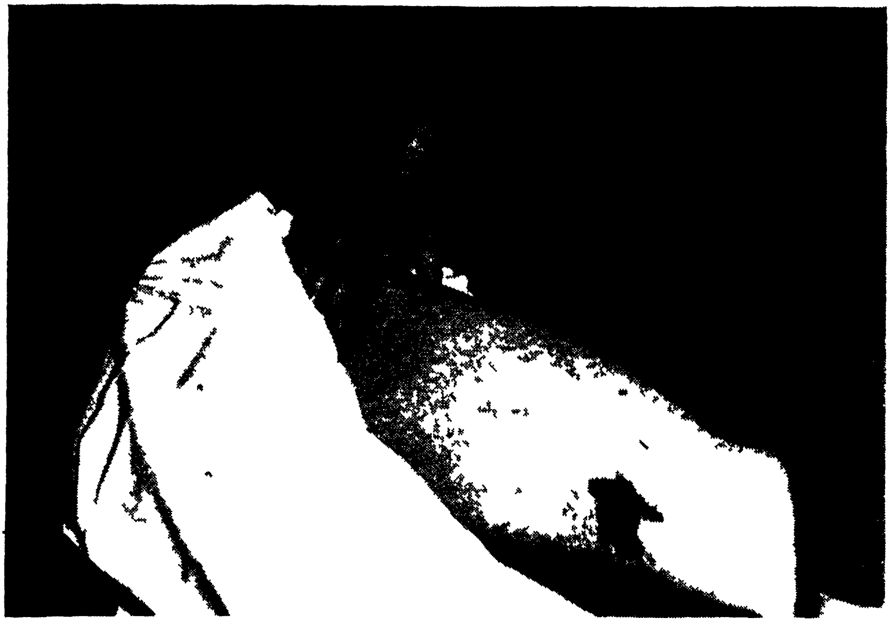
Blood from the Stomach or Bowel may appear as tarry black stools. Send for your doctor immediately, and in the meantime treat the patient for internal hæmorrhage.

Vaginal Hæmorrhage increasing or irregular at the change of life, or after, should make the patient consult a doctor immediately.

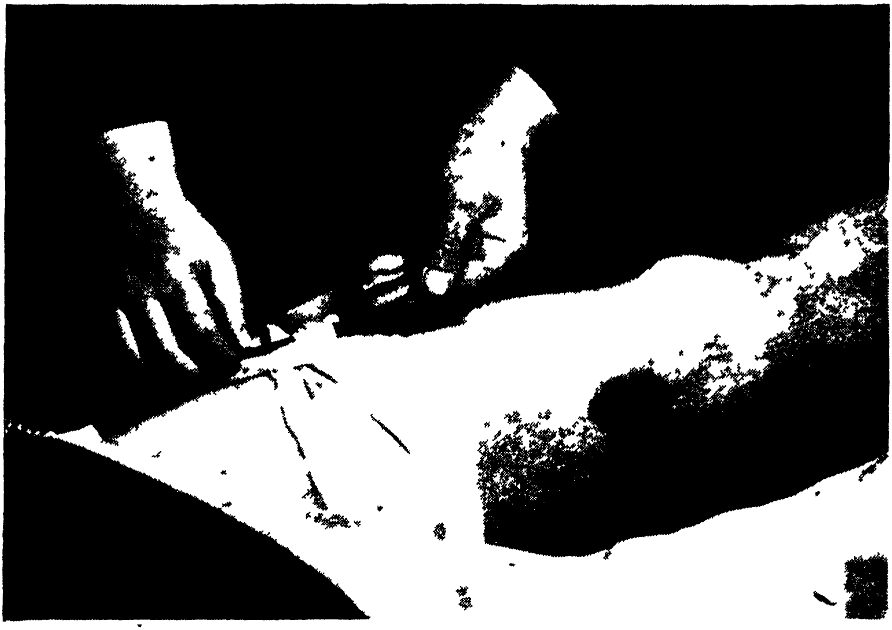
Blood in the Urine appears either as bright red blood, or the urine may be discoloured as a brick red or smoky tint. Both forms may be unaccompanied by pain. See your doctor at once.

FRACTURES

A Fracture is a break in a bone. It may vary enormously in extent; it may



Controlling femoral artery The wound is in the thigh, and indirect digital pressure is being applied to the femoral artery Notice the exact place where you may find the artery



A tourniquet is now applied Notice that this is an improvised tourniquet on the principle of the Spanish windlass (see pages 283 to 284) As a first aid measure, this is excellent

Bandaging Sound and Fractured Limbs Together (I). *In this case a splint is unnecessary The sound and fractured legs can be bound together One person should hold the ankles to keep the feet level See that pads are put in between the legs*

Bandaging Sound and Fractured Limbs Together (II). *The feet should be tied together and around the instep to prevent the fractured leg becoming shorter than its fellow.*

consist either of a simple crack or it may perhaps be a widespread splintering of bone (comminuted fracture)

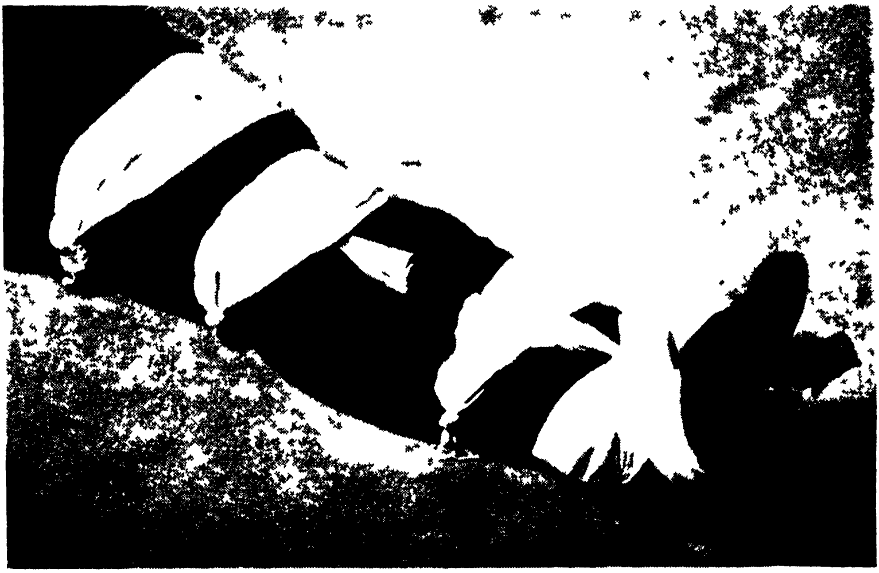
Violence, which is always the cause of a fracture, may break the bone at the site of impact or at a distance The wheel of a car may pass over and break the leg, for instance, and conversely a fall on the outstretched hand may break a collar bone

The strength of a bone frequently determines the extent of the damage This is exemplified by the bones of young children, which are elastic and bend to a remarkable degree before partially breaking (greenstick fracture) Healthy young adults frequently sustain a dislocation of a joint rather than a fracture, so demonstrating the great strength of their bones Compare this with the brittle bones of elderly people, in whom trivial violence may result in a broken bone

Far more important, however, is the question whether or not the overlying skin is broken A *simple* fracture is one in which the skin is unbroken, but if there is a wound with the fracture it is called *compound* In this latter type it may be possible to see the broken bone ends in the wound or even protruding through the skin Because all compound fractures are contaminated by germs it is essential to treat not only the broken bone but also the overlying wound

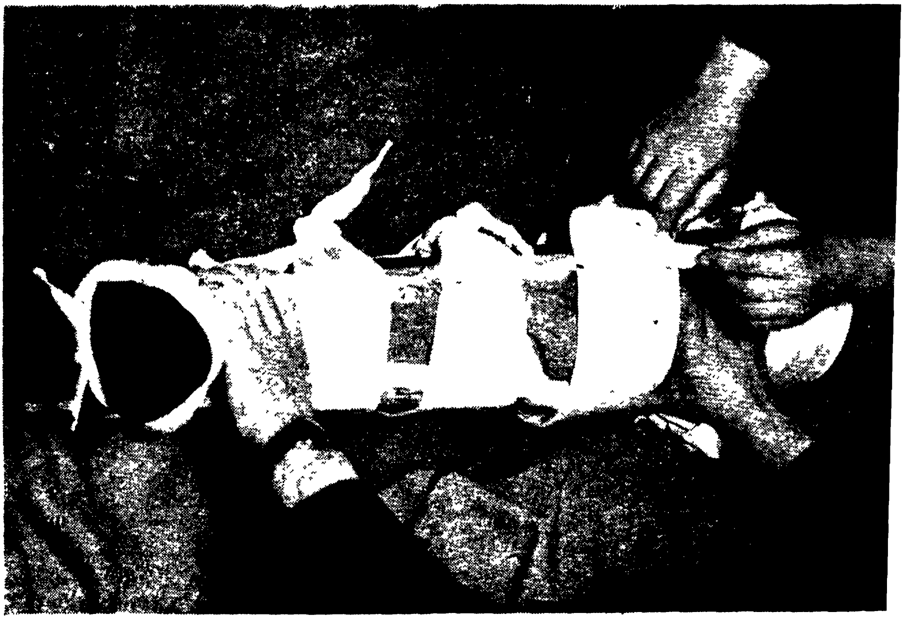
In addition to the comminuted and greenstick fractures already described there is an impacted fracture Here the broken bone ends are driven into each other by the force which originally caused the fracture Very often such an occurrence is fortunate in that pain is minimized and healing accelerated For these reasons handle every fracture very gently

In every case there will be a history of an accident either from the patient



Bandaging Sound and Fractured Limbs Together (III). *The legs completely bandaged Remember to tie the knots against the sound leg so that there is no pressure on the fracture Tie one bandage around knees, one above knees, and one below fracture site*

Splinting a Fracture (I). *Splints should be padded and extend above and below the joints on each side of the fracture. Get a helper to steady the limb above and below the site of fracture while the splints are slipped into position and the first bandage tied.*



Splinting a Fracture (II). *The first bandage is tied around ankle and instep. Next, on is tied above and one below the site of the fracture, and one round the knees, as shown*

Splinting a Fracture (III). *The leg completely splinted. General points to remember are that padding must be placed between the splint and the limb and that, if possible, the splint should be wider than the injured limb as in the photograph above.*

or a bystander. The points of importance which assist in the diagnosis are:—

Pain, which was of sudden onset and is made worse by attempting to move the injured part.

Loss of Function is the inability to move the limb because of the increased pain on attempted movement, or the mechanical impossibility; this is best exemplified by the inability to move the shoulder joint when the clavicle (collar bone) is broken.

Deformity is produced by the displacement of the bone fragments; it may be seen or felt. The limb may be bent or shortened.

Swelling always occurs at the site of fracture, and is at times very extensive.

Abnormal Mobility which occurs in unimpacted fractures is often concealed by the accompanying muscle spasm. Thus attempted movement by the patient or first aider may show that the limb wobbles. The movement of the broken ends on each other often produces a grating noise called *crepitus.* It must here be emphasized that deliberate attempts to produce abnormal mobility or crepitus by the unskilled are fraught with the risk of increasing shock and injury. The most serious complication of such meddlesome methods is to convert a simple fracture into a compound one.

Although we have mentioned all the physical signs accompanying a broken bone, remember that one or more may be absent; when in doubt, diagnose and treat as though a fracture were present until more competent advice is at hand.

TREATMENT FOR FRACTURE

Simple Fracture.—Treat the patient for fainting and shock (*see* pages 263-264) and send for the doctor.

While waiting take the following steps to prevent shock occurring: cover

A Fractured Arm (I). *Hæmorrhage is first dealt with in compound fracture. The padded splint is slipped into position The first bandage is round the hand and tied at the wrist*

A Fractured Arm (II). *When the remaining bandages are securely tied, the arm is put in a sling. The point comes at the elbow. One fold is brought under the injured arm, the tying point being brought to the shoulder and round the neck on the injured side. The injured arm is sloped upwards slightly as shown in the above photograph.*

the patient warmly with blankets or overcoats; prevent movement of the patient and the injured limb until the latter is adequately splinted, and reassure him; for fear produces shock. A cup of hot sweet tea with ten to fifteen grains of aspirin will calm not only the patient but also the relatives.

Place the limb in as comfortable a position as possible, using great care and gentleness; then steady the limb above and below the site of fracture until splints are ready. This manœuvre generally decreases the pain and shock.

Before applying splints it may be necessary to cut away clothing such as trouser legs or sleeves.

In most fractures of the lower limb a splint will be unnecessary because it is possible to bandage the injured and sound legs firmly together by applying bandages at several levels (*see* illustrations).

Fractures about the ankle are best treated by firm alternate layers of bandage and cotton wool. Support and steady the limb on pillows or folded coats.

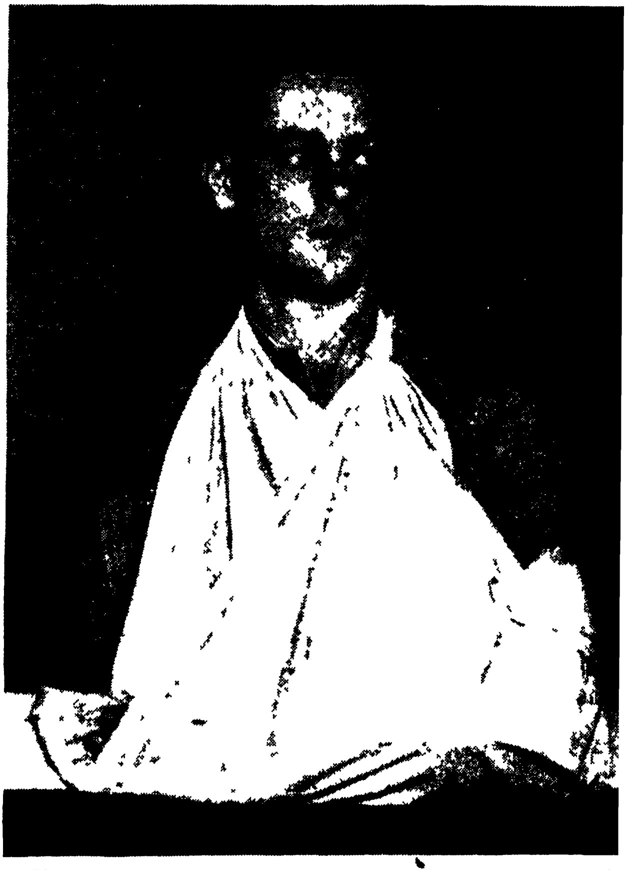
Because manufactured splints are very rarely available, it will be necessary to improvise a splint from household articles such as walking sticks, broom sticks, folded newspaper or cardboard, or even box boards. Remember that a splint is not only a surgical instrument but any object which will immobilize a broken limb.

1. See that the length of the splint extends above and below the joints on each side of the fracture. Do this by careful measuring of the sound limb.

2. The splint should be wider than the affected limb if possible.

3. Always pad the splint with wool, soft cloth or other material available, taking care to provide extra padding to fit the contours of the limb.

4. When bandaging limbs together



A Fractured Arm (III). *The other fold is brought over the injured arm, the tying point being brought to the shoulder The knot is tied in the hollow of the shoulder. The point of the sling enfolds the elbow and is fixed with a safety-pin.*

always interpose soft material between the ankles and the knees, thus preventing pain.

5. With one person supporting the limb above and below the fracture, the other slips the padded splint into the required position and bandages firmly with triangular bandages or strong pieces of material about eighteen inches long; a few of father's old neck ties serve admirably.

6. Make certain that the knots of the bandages are firm and cannot slip; but do not constrict the limb by tight bandaging.

7. It is permissible, and often desirable, to apply a splint over clothing, as much pain may be caused by unskilful and injudicious attempts to remove it.

8. Fractures of the upper limb after splinting must be supported by a sling around the neck or the other hand.

Compound Fractures.—Before treatment above, stop the hæmorrhage by digital pressure and apply a clean pad and bandage (*see* page 282).

DISLOCATION OF JOINTS

When a bone is displaced from a joint, as occurs more commonly in the healthy adult, the resulting dislocation is accompanied by signs and symptoms similar to a fracture. There is pain, often intense, shock, swelling, and a deformity of the limb. A dislocation, however, differs from a fracture chiefly in the presence of severe painful spasm of the surrounding muscles. Treatment is as for a simple fracture.

CONCUSSION

A blow on the head may be followed by momentary unconsciousness; this is called concussion, and is due to brain shock which may pass off entirely within a few minutes. There may be associated injuries such as a cut head or even a cracked skull.

As shock resembles concussion so closely a brief description of the two conditions will not be out of place. The skin is pale and cold and covered with cold sweat. The limbs are limp and flaccid. The pulse is rapid, and not easily felt. Breathing is shallow and rapid. The pupils are dilated and of equal size. In concussion shock is greatest at the beginning, whereas shock due to other injury, pain, exposure, or continued hæmorrhage, does not vary so rapidly and tends to increase unless active measures to prevent it are taken. Compare this with concussion where the period of unconsciousness may last for only a few minutes and then may be followed by a short period of rapid improvement in the patient's condition.

If unconsciousness lasts more than a few minutes, then a more serious condition of the brain is present. Loss of memory (amnesia) following concussion may be limited to the actual blow on the head or else the patient may not remember what preceded the incident by some hours. Recovery from unconsciousness is rapid and often heralded by vomiting.

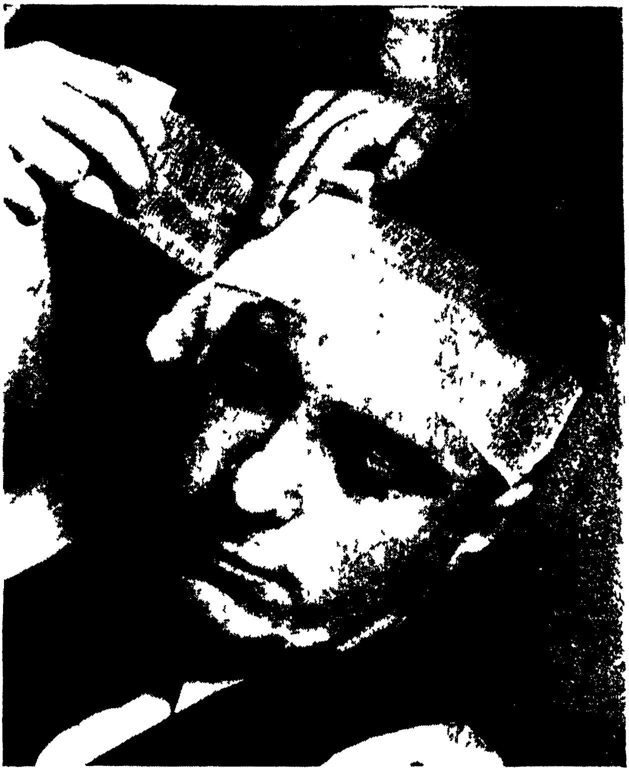
Deepening drowsiness following recovery from concussion after some hours may be evidence of increased pressure on the brain; this serious condition is preceded by a falling pulse rate.

The general treatment of shock and brain shock (concussion) is the same as the general treatment of hæmorrhage described on page 279.

Treat a cut head as described on page 266.

Do not administer smelling salts, sal volatile, or other stimulant. Firmly insist that the patient lies down until he is seen by a doctor, who should always be sent for in cases of concussion. A period of close observation with the patient in bed should follow every case of concussion. During this time take the pulse rate every half hour. Do not give any sedative; if the patient is unduly irritable or restless, ask the doctor to see him again when he may prescribe a sedative. Observe the patient for increasing quietness also, and the recurrence of vomiting, and inform the doctor.

Do not plug the ears if blood issues from them, but turn the patient's head so that the affected ear is lowermost, and let the blood run freely on to a freshly laundered towel.



Bandaging a cut head. Any hæmorrhage is first stopped; a dressing is then applied, and the head bandaged, as shown.

ABDOMINAL PAIN

Although the complaint of pain in the abdomen (stomach ache) is very common and not necessarily of serious import, it must be realized very clearly that the longer such a pain lasts the greater likelihood is there for it to be evidence of a surgical condition.

The sudden onset of colicky pain, that is, pain coming and going at regular intervals in the centre of the abdomen of a previously healthy and well child, may be the onset of acute appendicitis; far more often it is not. You cannot tell; sometimes the doctor cannot tell. But until a definite decision has been made by the doctor it is of the highest importance to emphasize that *under no circumstances whatever should a purgative be given.*

This is a natural mistake that may well be made by an anxious mother who has often relieved a mild disturbance by giving a child opening medicine. But when the symptoms are as described above—that is, *sudden, severe* pain that *comes and goes* and in a normal healthy child, then the doctor is the only person who should be trusted to give treatment at all.

This point must be stressed because it is of great importance; but, of course, such a pain does not necessarily mean anything very serious; and no mother need feel unduly alarmed—but she should call in the doctor as soon as possible.

If you are uncertain, and you do not want to call a doctor in the middle of the night, take the risk of waiting until morning, but do not increase it by giving an aperient because it may result in the bursting of an inflamed appendix which is the cause of peritonitis.

If the pain lasts for six hours in spite of warm blankets, and a natural attempt to open the bowels, hand your grave responsibility over to the doctor.

An adult with very severe abdominal pain should be seen by a doctor as soon as possible; meanwhile keep the patient warm and apply-hot-water bottles to ease the pain.

CARBON MONOXIDE POISONING

This is due to breathing coal gas from a leaking tap or main. It may also be due to breathing in the exhaust fumes of a car in a closed garage.

This is a serious accident because highly poisonous gas is taken into the blood instead of oxygen.

Certain common-sense precautions should be taken by any person who possesses a car. He should never run the engine inside the garage unless doors or windows are open. He may be overpowered before he realizes what is happening.

In the case of household gas, a leaking tap or pipe is noticeable to any person entering the room or coming into the vicinity, because domestic gas has a distinct smell. The danger is that it is not always noticeable to the person or people who are themselves in the room or in the close vicinity of the escaping gas fumes.

It is as well to make certain periodically that all gas appliances such as stoves, fires, etc., are quite in order, and instruct all members of the family to be certain that they turn off gas properly.

If the amount of gas present is insufficient to cause unconsciousness, the patient will notice headache, dizziness, faintness and vomiting. Later still mental confusion is noticed, and then unconsciousness sets in.

Remove the patient immediately into the fresh air, and apply artificial respiration if breathing has stopped (*see* page 123). Keep him warm with blankets and send for medical aid.

Other forms of poisoning, together with explanations of various kinds of poisons, their effects on human beings and the treatment to counteract such effects are dealt with fully in Part I, Chapter VII, "Drugs and Poisons."

PHLEBITIS AND WHITE LEG

Phlebitis, or clotting of the veins, occurs as a part of several diseases for which the doctor will be in attendance already, so that there is no need to discuss further this hard, painful, swollen vein in the leg over which the skin is often reddened.

Again, white leg or clotting of the main vein (femoral vein) of the leg following childbirth is a condition in which the doctor will be in attendance. If he is not, however, simple treatment is the best.

TREATMENT IN PHLEBITIS

To relieve immediately the cramp-like pain give fifteen grains of aspirin and apply compresses of cold water or eau-de-Cologne every four hours. The leg should be supported in bed by pillows or sandbags. The patient should not sit up too much as this will bend the vein and may delay healing, and it is important to support the foot with a piece of board or even large books.

Encourage the patient to take deep breaths as this increases the venous return, and also to press firmly against the foot supports at least four times a day.

After two or three days it will be possible to provide elastic support for the limb by strapping firmly with crepe bandage or one of the many proprietary adhesive elastic bandages. This prevents a type of swelling which can be very obstinate.

It must be realized that phlebitis or "white leg" takes a very long time to clear, and the patient must be told that it may take six weeks or more before he or she is allowed out of bed.

As often happens in this type of illness, the patient may get impatient, and, feeling quite well, will want to get up and move about. It is essential that the condition should clear up to the satisfaction of the doctor before this is allowed. It may aggravate the condition to allow moving around too soon.

If phlebitis recurs in a young person with good circulation and varicose veins, and is not a part of another disease, then it is permissible to strap the limb with an adhesive elastic bandage up to and above the area of clotting, and allow him to walk about. If there should be doubt of any kind seek medical advice.

CHAPTER XIV

HYGIENE AND A.R.P. IN THE HOME

by L. COSIN, F.R.C.S.

The public must clearly realize the dangers of heavy air raids, and the measures to be adopted to combat them.

The chief danger is the high explosive bomb of varying size and weight against which most of our air raid precautions are directed.

The high explosive bomb carries a varying charge of high explosive such as trinitrotoluene or ammonite which is exploded by means of a detonating charge or contact with the ground. As a result of the explosion a very rapid movement of air occurs in the immediate vicinity of the explosion and spreads out in all directions. This is called *blast*, and it is this which does the greatest harm in damaging doors, windows, weak walls and light objects, as well as injuring human beings.

Immediately after the enormous expansion of air there is a similar and opposite contraction of air locally, the so-called negative wave or *suction*. The suction effect is as powerful as blast, but acts by sucking sides of buildings, doors, windows and roofs out and away from the remaining shell; this explains some of the remarkable pictures you have all seen of bomb damage in various parts of the country where beds have been left in a room the front wall of which has been sucked out.

The third and least harmful effect is the earthquaking which results in windows, doors and walls being shaken out of line by fractions of an inch and roof tiles being shaken off. Unless the building is very unsafe previous to the earthquake effect no serious collapse of walls occurs.

Blast is of two types; the more harmful type is the "horizontal" due to the bomb falling on a hard surface and the blast effect being spread horizontally or straight outwards, whereas the less harmful "vertical" blast is due to the bomb falling in soft earth and burying itself for a varying distance. Thus the softer the surrounding ground, the less severe is the effect from blast (Fig. 1).

EFFECTS OF HIGH EXPLOSIVE

The chances of a direct hit by a high-explosive bomb are very slight. The majority of casualties are caused by bombs which fall in the near vicinity. The chief dangers to which you are exposed from high-explosive bombs are:—

1. Blast and its effects.
2. Suction and its effect, which is chiefly falling masonry.

You would be mistaken if you thought that suction occurs in the identical spot as the blast; this is not the case, and any spot quite close to the explosion may entirely miss the effects of blast and undergo the full effects of suction, and vice versa.

3. Flying bomb fragments; these may be quite tiny but are travelling so fast that they can easily pierce skin or flesh and even break a bone.
4. Flying glass and wood due to blast.
5. Falling masonry due to blast or suction.
6. Noise.

It now becomes clear what steps you should take in the home in order to guard against the effects of high-explosive bombs.

It has been abundantly shown that a shelter below ground level covered over by earth is proof against all except a direct hit. The instructions for making a shelter of either the Anderson type, or of steel or cement are too well known to require more comment. You must be careful to have enough earth covering any part of the shelter above the ground to prevent flying bomb splinters piercing the shelter. Two to three feet of piled earth in boxes or sandbags is a safe minimum. As the shelter will probably be slept in at night, steps must be taken to ensure adequate heating, lighting, sanitation, freedom from damp and flooding in low-lying areas. Because of the latter danger it may be necessary to erect overground shelters with a minimum thickness of fourteen inches of brick wall and a pitched roof of ten inches of reinforced concrete.

The deep Tube or tunnel shelters are, of course, safe against all effects of high-explosive bombs; and other considerations to preserve health in shelters will be discussed later.

THE SHELTER ROOM

If it is not possible or desirable to use a specially erected shelter, then it is often possible to convert some part of the house in which you live into an efficient shelter. If there is a basement with an emergency exit (the coal hole often is enough) it can be made safe by shoring up the walls with wooden supports, or old gas piping of the correct length will often suffice.

If there is no adequate basement then a ground floor room must be prepared by shoring up if necessary. The chosen room or passage must be protected by outer rooms with thick walls on each side and have an emergency exit; if there is insufficient protection, a baffle wall of nine inch brick, cement or breeze blocks, sandbags or even earth in boxes should be prepared.

No basement is safe unless there is some type of emergency exit. A close inspection of the position of water, gas and sewage mains (your local builder will tell you this) should be made so that a leak can be rapidly stopped

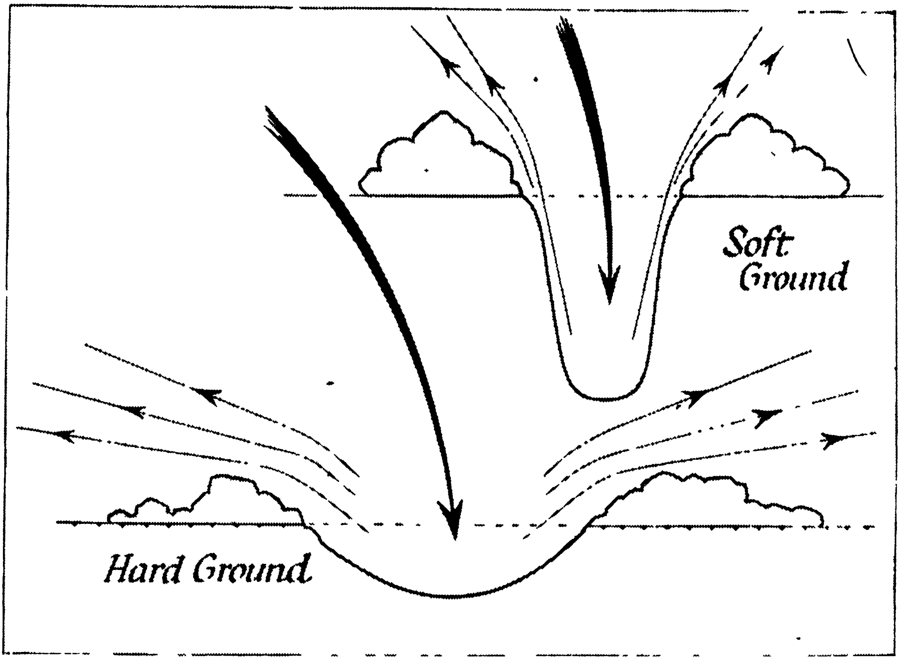


Fig. 1. *Diagram showing the effect of blast in hard ground, and soft ground.*

temporarily until those inside can reach a place of safety.

If you have followed the instructions given you will be safe against most of the effects of blast, flying bomb fragments or splinters of glass. Nevertheless, it is advisable to protect all your windows by sticking on old lace curtains or the specially prepared net curtaining which is not now very expensive.

If you are caught away from your own home or shelter, and danger is imminent, ask a policeman or warden where the nearest shelter is and *go to it*. If there is no shelter or advice close at hand and bombs are falling, lie flat against the nearest low wall with your arms in front of you, so that your chest does not come into immediate contact with the ground. Take great care to keep at least thirty or forty yards away from buildings which might easily collapse and injure you.

If you are in the country, lying in a ditch or even in an open field will alone protect you against machine gun bullets or bomb splinters. The effects of blast are most dangerous in towns, and least dangerous in open country.

INCIDENTAL DANGERS

Incidental dangers to which I shall briefly refer are burns due to fire, following the dropping of incendiary or high-explosive bombs, and carbon monoxide poisoning due to escaping domestic gas from broken mains or pipes, or incomplete combustion.

The fire following a high-explosive bomb is one that should be left strictly to the attention of our highly skilled fire fighting services. All endeavour should be directed towards saving life, and any valuable personal effects. Fire due to incendiary bombs dropped from the now familiar Molotov bread basket (merely a collection of a hundred or so incendiary bombs in a steel case) is easy to overcome provided prompt action is taken.

INCENDIARY BOMBS

The thermite incendiary bomb weighs only 2 lb., and is not heavy enough to do more than penetrate a roof, so that usually the site of the fire is on the top floor of the house or in the loft. It is for this reason that the Government has ordered the clearing of all inflammable articles from attics. Although the bomb will rapidly burn through the usual type of floor, three inches of sand or a layer of the specially prepared type of asbestos sheeting will resist fire until the bomb has burnt itself out. This takes from five to twenty minutes. It has been found by experience that very simple measures, such as throwing sand or earth, or spraying water from a stirrup pump, soon puts the bomb out. If a Redhill container or even the bucket of sand with an ordinary domestic shovel with a long handle attached is available, the bomb can be scooped up and carried outside the house without difficulty.

It has become evident that precautions against incendiary bombs involve some slight extra personal risk.

The oil bomb is more dangerous than the incendiary bomb in that it is much heavier, penetrates farther and burns longer because of the large quantity of oil. Moreover, these oil burns are more dangerous and produce a more severe type of burn. Here again the resultant fire is best left to the fire brigade.

It should not be necessary to point out that no unauthorized person should interfere with an unexploded bomb, cannon shell or anti-aircraft shell, nor should he handle any unfamiliar object outside whether attached to a parachute or not. Yet many lives are being lost and people maimed by reason of failure to observe this very simple and obvious rule.

Having explained in some detail the dangers and injuries to which you and yours may be exposed we are now in a position to provide treatment for the various types of casualty.

TREATMENT FOR CASUALTIES

Blast in itself can be the cause of trivial or severe injury; the latter may be a simple concussion such as occurs after a blow on the head, or injury to the lungs so that automatic breathing may be suspended for a time. It is highly dangerous in this cessation of breathing to apply the ordinary methods of artificial respiration. All that should be done is to keep the patient warm, treat for shock and wait the arrival of skilled medical attention.

Attention is drawn to this type of stoppage of respiration because the other more common type is due to breathing in of a poisonous amount of *carbon monoxide* which is the dangerous part of coal gas poisoning. If you find any one who has not been in the neighbourhood of a broken gas main and is not breathing it is wiser not to administer artificial respiration.

On the other hand, stoppage of respiration due to carbon monoxide poisoning should be rapidly but gently treated by the method of artificial respiration you know best.

Schafer's method of artificial respiration is as efficient as any (*see* page 123).

Shock is an invariable accompaniment of severe physical injury although it may occur in the absence of such injury. It is recognized by the patient's condition of pallor, feeble, rapid pulse, pinched, drawn look or anxiety, or profuse sweating although the patient may be deathly cold. Treat this by the removal of the patient from immediate danger, although it is wiser not to move the patient if he is in a comparatively safe place. Do not give stimulants (brandy, smelling salts) but apply warmth (blankets, shawls, rugs, hot-water bottles). If the patient is sufficiently well to swallow, a sweet, hot drink should be given. No further treatment should be applied in the absence of hæmorrhage until skilled attention arrives. (For treatment of hæmorrhage *see* page 279.)

Flying Bomb Fragments.—Treat for shock as above. Treat severe arterial hæmorrhage by direct pressure by the fingers (digital pressure) and a clean handkerchief or towel. If hæmorrhage cannot be controlled by this method apply a tourniquet (*see* page 282).

Serious Flesh Wounds should be covered by a clean handkerchief or towel; do *not* apply any antiseptic.

Flying Glass.—Flesh wounds due to flying glass are not usually as serious as those due to bomb fragments, and although they may bleed profusely, can usually be controlled by digital pressure with a clean handkerchief.

Falling Masonry may cause a relatively slight injury (concussion, bruising or flesh wound) or very severe fractures in a trapped, shocked patient. Here the need for skilled medical attention and a trained demolition squad is essential, but plenty of hot water, clean towels and calm assistance will be invaluable to the doctor in his work.

Anti-aircraft Shrapnel.—The chances of injury due to this hazard are considerably diminished by the standard helmet.

Noise.—After over two years of war and months of the Nazi Blitzkrieg we have had forced upon us the realization that the enormously increased amount of unaccustomed noise has its own effects upon the nervous system.

We must now realize that much of the noise is not harmful because it is due to our own anti-aircraft fire, and it behoves every mother of small children not only to maintain her own courage, but to see that the children are not unduly alarmed. She should explain to them all that the noise, although unaccustomed, is helpful and is keeping them safe. She must teach them to expect a certain amount of noise due to our own guns, and that we must now accustom ourselves to this and regard it as a normal accompaniment of life. She must teach not only children but other adults the proper way of conducting themselves in the air raid shelter wherever it may be. She must point out that all the necessary steps for their safety have been taken, and that it is helping no one and worrying many to listen intently with strained expressions for the next loud explosion. This attitude of mind alarms every one, the children more than the adults, and will very soon reduce their morale. Every one must be occupied and given a job of work to do or the children some game to play.

The children can also occupy their time by day in small household duties such as knitting, darning, cleaning the vegetables and other useful tasks. A wise mother thinks out carefully little jobs which each child enjoys doing, as this will cause a greater preoccupation and enable them to ignore outside conditions more easily.

Undue alarm and consequent fussing should not be shown if a person, after a continuous noisy bombardment, complains of deafness or even bleeding from the ear, as this does not always denote a serious injury. Bleeding from the ear may be due to a ruptured ear drum which is also shown by deafness and "ringing" on that side. Both the deafness and the ruptured ear drum will soon recover and the sufferer be none the worse for this unpleasant experience. Reassure the patient on these lines, and tell him or her that the bleeding will soon stop. Meanwhile, cover the whole ear with a clean handkerchief and bandage it lightly into place. *Never* try to plug the ear with cotton wool or anything else, as this may result in septic complications. *Never* insert any ear drops or ointments, as this also may be harmful.

Burns and Scalds.—Burns occuring in the house are most commonly due to flying particles of magnesium metal from an ignited incendiary bomb or the burning oil from an oil bomb.

As the full treatment of burns has already been discussed in previous chapters the reader should refer to them (*see* pages 270-272).

USE OF GAS

Before giving you a few practical details on the prevention and treatment of injuries due to gas, the different types of gas likely to be used are indicated briefly.

It should be realized, however, that the essence of success by the use of gas is the element of surprise. That is why it was so successful in the early part of the 1914-18 war and in the barbaric war of the Italians against the entirely unprotected and unsuspecting Abyssinians. There it was successful because of the necessary element of surprise; here in England, if gas is ever used, it has already failed because we are prepared for it. In fact, the greater our preparations against it, the less likely is it to be used at all.

Again do not imagine that because you have been exposed to gas that you will necessarily become a casualty. This is definitely not the case. Let it be realized that it is quite impossible for any large area, in country or town to be so bombarded by gas bombs that each person there will be affected, even without the usual precautions.

Because we have not been subjected to gas attacks do not scoff at our precautions; they have been invaluable, for it is by our preparations that we have prevented the element of surprise being present. Carry your gas mask, and make your children do the same; it may look odd, and people may laugh at you, but remember that if we all gave up carrying our masks the Nazis would immediately consider using a gas. Remember also that the number of people who carry their masks are not only protecting themselves, but are also setting a good example and doing something which helps to protect others who are foolish and careless.

Remember, too, that every person taking adequate cover in an air raid is not only preserving his own life and limb but is also taking the strain off our hard worked but very adequate first aid, nursing and medical services. A person who carelessly and without good reason allows himself to become a casualty is not only a nuisance to himself but a liability to others.

It must be repeated the more steps we take to prevent ourselves being surprised by gas the less likely is it that this weapon will be used.

PRECAUTIONS AGAINST GAS

Only the common types of poisonous gases which might possibly be used will be mentioned.

Wherever high explosive bombs or shells have been used, a stinging pungent acid odour of the cordite or other high explosive will be found. This clears away in a few minutes and it should not be confused with any of the poison gases.

Poison gases are most easily classified into the two main types: persistent and non-persistent.

The noise of guns and bombs may sometimes cause deafness, or even bleeding from the ear. This is not necessarily serious; do not plug the ear. Place a pad over it and bandage.

PERSISTENT GASES

The well-known **Mustard Gas** and **Lewisite** are especially dangerous because their noxious action lasts a long time, due to the fact that the oily liquid gives off its vapour slowly.

Other factors such as moisture, temperature and climatic conditions also vary the rate at which the poisonous vapour is given off, but these need not concern you.

What you must realize is that if a gas bomb explodes near you, and you or your children are splashed by the liquid or exposed to the vapour, it is *absolutely necessary* for you to get yourselves away from the poisonous effects of the vapour as soon as possible. It is no exaggeration to say that every second counts, and speed at this period may save weeks of uncomfortable and painful illness.

If uninjured, adjust all respirators and see that they are working efficiently. Next rapidly examine any one who complains, and then every one else for small spots of liquid. If there is nothing else available carefully wipe these from the skin with a piece of rag or cotton wool soaked in petrol, benzine, paraffin, water or even saliva. Next wash out everybody's eyes with ordinary water or a weak solution of bicarbonate of soda (1 teaspoonful to the pint of warm water). Do not listen to any one who says that their eyes are unaffected, for the full effect may not be felt for a latent period of from one to forty-eight hours, although the liquid poison gas acts more rapidly.

STRIP AND WASH

Finally conduct every one to a place where there is a profuse supply of water, preferably hot, and soap, tell them to strip and wash themselves down very thoroughly so that the whole body has been covered with a thick layer of soapy lather before allowing them to wash it off. Dry them in clean, dry towels and take them into another room.

Place all discarded clothing into a well-fitting dustbin or else soak it in water containing chloride of lime.

All reference to the gas proofing of rooms has been intentionally omitted, also to the careful seclusion and gas proofing of undressing and decontaminating rooms, because these are theoretical possibilities which we can only hope to carry out. It is far more important for you to carry out the simple measures mentioned rather than depend upon being in the near vicinity of an authorized, official and efficiently functioning decontamination centre.

I have not referred to the use of bleach pastes or bleach ointments made from chloride of lime because the time limit during which they can be helpful is at the outside ten minutes from the time of exposure to the persistent gas vapour, and still less to the liquid. After the time limit of ten minutes it is doubtful whether any good can be done, and if the skin is already becoming inflamed, the application of bleach is definitely harmful. Never apply bleach in any shape or form to, or near, the eye.

Remember that if you or yours complain of pain and watering of the eyes, which may later cause you to screw them up so closely that you cannot see, this is not blindness at all. Blindness due to persistent gases in the 1914-18 war was a very rare complication. Three-quarters of the men exposed to mustard gas were back in the front line within two weeks. Most of the rest were back within two months.

It is only when surprised without gas masks that the casualties were at all heavy or serious. Remember this and repeat it often to the scoffers.

After some hours mustard gas causes reddening of the skin with blister formation. Cover these with a clean handkerchief and go to a doctor or first aid post for skilled attention. Bronchitis due to mustard gas again needs medical attention.

CONTAMINATION

Any food not kept in airtight tins and possibly exposed to persistent gas vapour should be discarded.

Contaminated clothes should be taken in the close-fitting dustbin to the appropriate centre for decontamination by the local authority. Find out in advance from the town hall or your dustmen where the centre for decontamination is situated.

Lewisite, the only other important persistent gas, differs from mustard gas in that its effects are felt much more rapidly and that it has a faint smell of geraniums. The smell of mustard gas is not characteristic and can be easily missed.

Your civilian respirator protects eyes, face, windpipe and lungs against both gases.

The nose irritant and tear gases are only able to act for a short time before their effect disappears, but they can make you very uncomfortable, so use your gas mask, which is complete protection against them. No permanent damage is done, and as soon as the effect on eyes, nose or throat wears off you are quite fit again.

Phosgene.—This is the only non-persistent gas which has any delayed effect and this can be quite serious, so that it is necessary for you to know something about it.

Once again you should remember that if you are ready to wear your gas mask at ten seconds notice and are uninjured, you will never be a casualty from phosgene gas.

So that you may be under no delusion as to the relatively slight effect that phosgene may have the Hamburg disaster in 1929 should be mentioned. Here a cylinder containing eleven tons of phosgene exploded for some reason which was never found out, nor was the presence of this large amount of poison gas ever explained. As a result only twenty-nine people died while some scores were casualties, but recovered. When you think how small the average phosgene bomb is and how scattered the effect of many, it is surprising that so few people were affected; moreover, the population was taken entirely by surprise and no gas masks were available. You must realize, therefore, that the real effect of phosgene is to produce panic in an unprepared populace. Be prepared!

TREATMENT IN PHOSGENE GAS

The treatment of phosgene casualties depend upon how serious the patient's condition is. The large majority of people exposed to phosgene may show no effects at all but it is wise to insist that the patient should rest from all exertion and go to bed for twenty-four hours at least. This is to prevent the so-called "delayed effect" of phosgene, which can seriously damage the heart muscle, if neglected. Rest largely prevents this complication.

BLUE PHOSGENE CASES

If the patient shows difficulty in breathing and some blueness of the lips, it is because some of the lung cells which are responsible for breathing in oxygen from the air have become temporarily damaged. Insist on the patient resting in bed; keep him warm, treat for shock. Arrange for a doctor to call, or for the patient to be taken to a first aid post. A person lying quietly at rest requires roughly one-tenth of the amount of oxygen he would require if performing heavy work. This lessens the strain on the damaged lungs and the potentially damaged heart muscle.

Very rarely, the patient is an ashy grey colour with a feeble rapid pulse, sweating, and an anxious look. This person is seriously ill and while the measures for the "blue patient affected by phosgene" must be applied as rapidly as possible, the need for skilled medical nursing and hospital attention are essential. Never apply artificial respiration to this type of patient, for it can only further damage the lungs.

The effect of phosgene on the heart and the lungs is usually only temporary and all possible danger will be overcome at the end of a few days.

HEALTH AND HYGIENE

In these days of unavoidable crowding in air raid shelters the dangers of respiratory illnesses must become greatly increased, especially for the children, but you can do much to minimise these risks by taking a few simple precautions.

It is assumed that you have taken all the necessary steps to ensure adequate warmth, and freedom from dampness in your own shelter. If you have not, you must get your husband to apply to the local authority who will give him free advice on preventing damp.

It should be stressed again that structural details of erecting shelters will not be gone into here, the local authorities will be only too glad to give individuals all the advice and help that they can regarding the building and maintenance of family shelters.

It is no use whatsoever taking precautions to ensure safety from high explosives and incendiary bombs if you do not take adequate care that your

Any one with a cold should wear a mask over the nose and mouth while in the shelter to prevent the spread of infection. Directions for making the very simplest kind are on page 306.

family shall maintain physical health under difficult conditions.

If you must walk to your shelter in bad weather even if it is only a short distance, you may get your outer garments and your footwear damp. It is essential that you do not settle down for the night or allow your family to settle down in clothes that are even slightly damp. You are then asking for a cold. It should not be necessary to add that this rule of precaution against damp applies to any bedding you may have to carry with you.

You must ensure adequate warm meals while in the shelter. If you can get an oil cooking stove, heating of water and soups is easy; if not, get two or three large Thermos flasks and fill them with tea or cocoa in one, and a good thick vegetable soup in the other. This, with a piece of bread makes a good meal, especially if followed up with a piece of chocolate.

It is not enough to provide cold sandwiches only in the cold winter months.

Epidemics spread much more rapidly in the presence of dirt. Prevent this by insisting that the whole family baths regularly when it is possible: otherwise a good wash down in the kitchen with plenty of good soap and hot water. If you have none, owing to air raids, find a friendly neighbour or else go to the local public baths.

Take care to see that every one, especially the children, has enough warm clothes before they settle down for the night. You cannot sleep comfortably, or even rest, if your body and especially your feet are cold.

Make sure that every one has been to the lavatory before settling down and you will soon be able to get the younger children trained to have their bowels open at the most convenient time. Otherwise, you will be in for a disturbed and restless night with increased chances of catching colds and chills in difficult conditions for nursing.

Simple precautions will minimise the risk of spreading or contracting infection if you must spend your nights in an air raid shelter Gargling and sniffing salt and water up the nose (1 teaspoonful to the pint) are common-sense measures every one should follow

The chances of catching air-borne diseases like colds, influenza, cerebro-spinal fever, measles, whooping cough and pneumonia can be much diminished if you adopt the precautions outlined here

The chances of catching air-borne diseases like colds, influenza, cerebrospinal fever, measles, whooping cough and pneumonia can be much diminished by three common-sense measures:—

1. Gargling the throat and sniffing salt water (1 teaspoonful to the pint) up the nose will clear the passages and help considerably.

2. Spraying the air with some good antiseptic.

These two measures, combined with the wearing of a mask, as used by doctors and maternity nurses, over the nose and mouth will help to prevent any spreading infection.

Now if any one has a cold or is feverish you must insist that this person wears the mask properly all the time you are in the shelter, and if they are coughing or sneezing, they must turn the head away from the others.

A mask can be very easily made at home for each person by taking eight layers of ordinary surgical gauze or butter muslin and inserting a piece of cellophane or ordinary greaseproof paper in the middle.

The mask should measure ten inches by four for an adult and correspondingly smaller for children. Sew tape nine inches long to each of the four corners and insist on every one putting the mask on properly. After a few days of very slight discomfort you will find that every one wears the mask easily, even when asleep.

Wearers of glasses will complain that the glasses become steamed over very easily. Prevent this by using one of the proprietary anti-dim preparations which may be obtained from any chemist.

A very cheap substitute is made by lightly smearing the glass with moistened toilet soap and then polishing the lenses gently so that a thin, even film of soap is left on. This does not obscure vision and at the same time prevents condensation of steam from the breath.

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